JANUARY 13, 1958

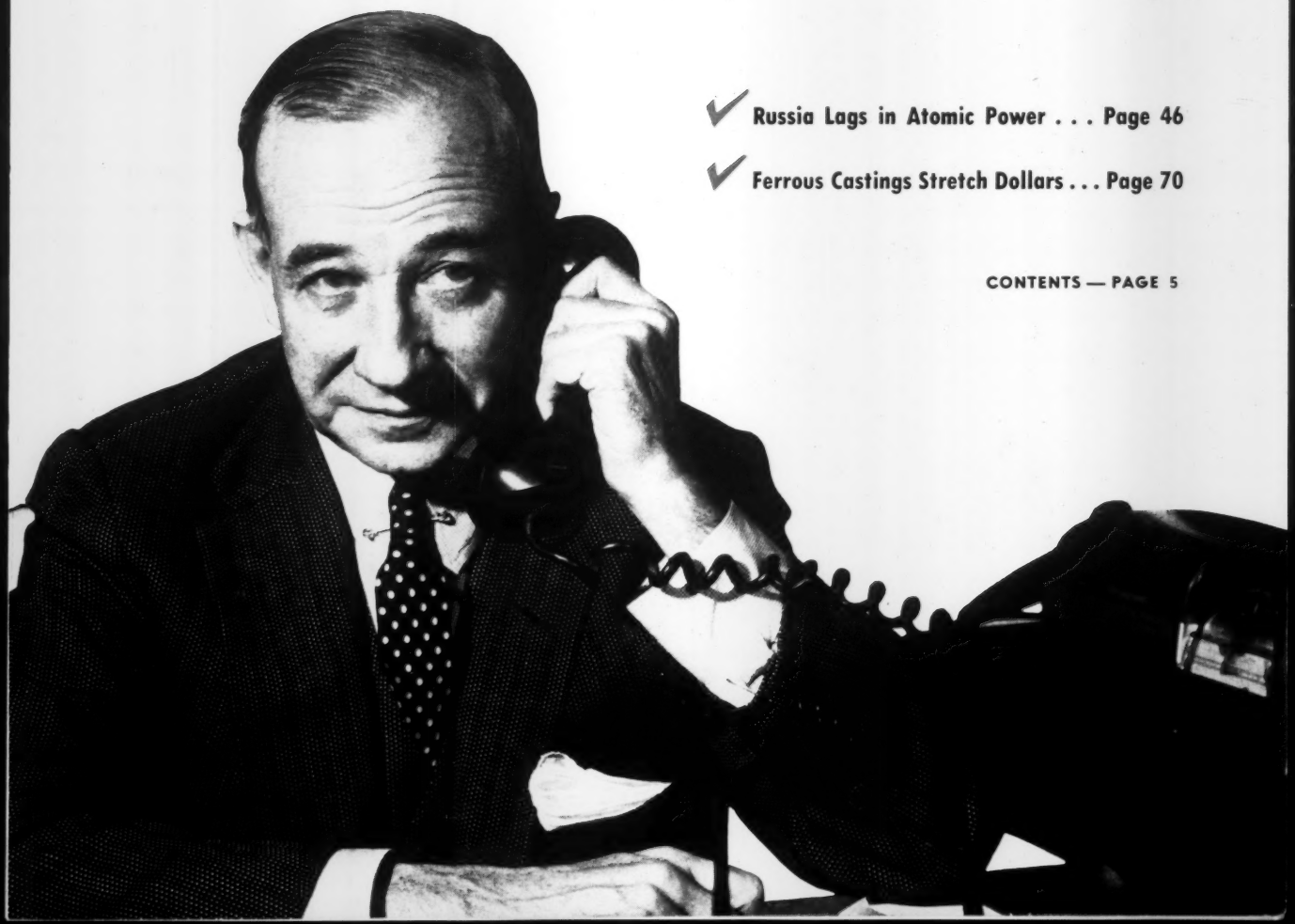
STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Comeback for Copper?

Robert G. Page of Phelps Dodge Corp. sees copper keeping pace with the electrical industry's growth

—Page 35



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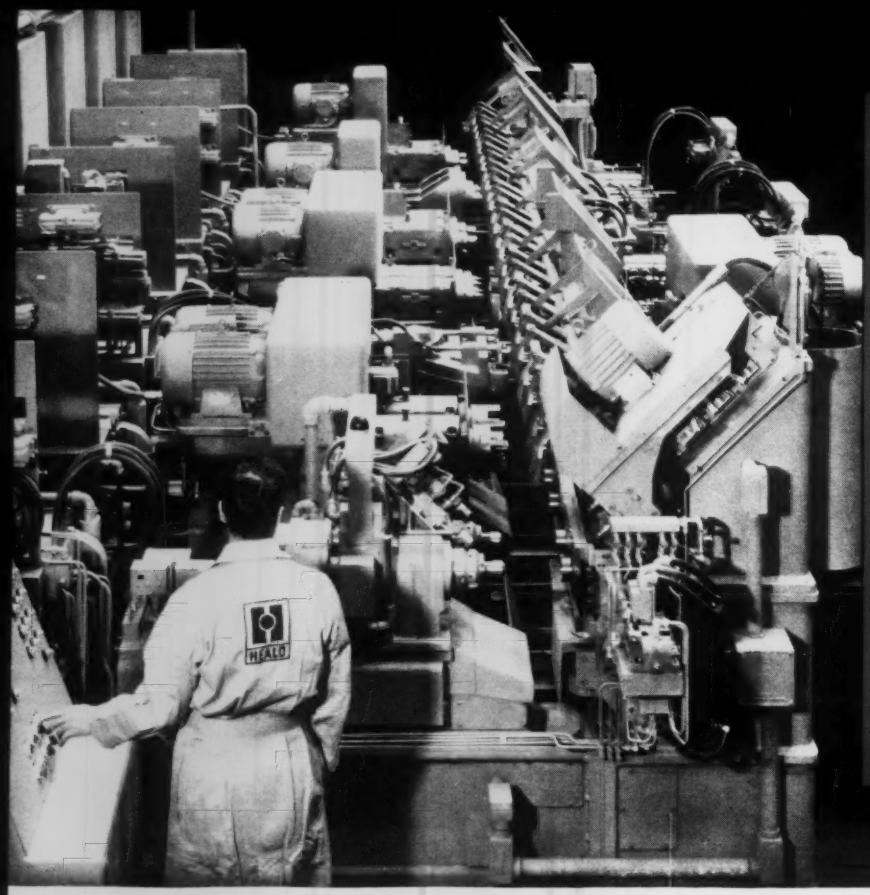
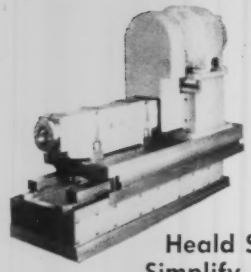


Here's Why BORE-MATIC VERSATILITY SAVES MONEY on Any Automated Production Line



When the time comes for a job changeover, you can do it at a saving with Heald Bore-Matics

Heald Slide Units Simplify Automation

The Heald *Slide-Unit* is the basic "building block" of an automated Bore-Matic production line. This simple, compact, hydraulically operated unit, complete with boringhead and drive, can be mounted in any position and can approach the work from any angle. It can be tooled for any desired operations — from roughing to precision finishing.

Because each Slide Unit is a separate and completely self-contained machine—arranged through interlocking control circuits to function as a fully automatic segment of the entire production line — individual machines can be added as required.

THE versatility of a Heald Bore-Matic has often been cited in terms of the machine's ability to perform a number of operations simultaneously. But this basic versatility has another advantage—one that is particularly important where large, automated equipment is involved. It *protects your investment* against the danger of early obsolescence!

For example, a Heald automated production line consists of the required number of *basically standard* Bore-Matics — tooled up to perform the required operations on a specific part. The machine becomes "special" only where part design requires it. Upon completion of the job for which the machine was designed, it can usually be re-tooled and put to work on a brand new operation — with a minimum of structural changes. This simplicity and economy of job changeover eliminates much of the "risk" in planning a long-term investment in automated equipment.

If you want a production line that's *protected against obsolescence*, talk to your Heald representative about Multi-Unit Bore-Matics, another example of why *It Pays To Come To Heald.*

HEALD®

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

Machining spur gears made from Bethlehem forged-and-rolled blanks.

When the Blank is Sound, Machining Costs Go Down

You probably know a machinist whose specialty is gears. Some day ask him what a sound blank means in terms of machining speed. Ask him how a sound blank reduces costs.

Directly or indirectly, his answers will tell you why Bethlehem gear blanks are so widely specified. Wherever these sturdy Bethlehem products are used, their advantages are instantly apparent. Made in a two-way mill that both forges and rolls the steel, they are highly uniform and very strong throughout. Internal structure is excellent. There are no hidden pitfalls beneath the surface to snag the cutting tool, delay the work, or cause rejects. These circular blanks can be turned, bored, faced, and hobbed with complete assurance of a good finished job in every respect.

You can obtain Bethlehem forged-and-rolled blanks in sizes from 10 to 46 in. OD, heat-treated or untreated. They are available in a wide range of sections. Use them not only for gears, but for crane and sheave wheels, flywheels, turbine rotors, brake and clutch drums, pipe flanges, etc. Many details are covered in Booklet 216, a copy of which will be mailed at your request.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

(Advertisement)

Resistance Welding Jet Engine Parts

SCIAKY

HELPS PUT PROFIT INTO MANUFACTURING

Heintz Achieves Volume Production with New Sciaky Counter Control Welders

In fabricating and job shops, where a wide variety of assemblies must be welded to rigid specifications every day, Sciaky resistance welding helps keep production schedules *on schedule*.

The Jet Engine Division of the Heintz Division, Kelsey-Hayes Company, a large Philadelphia contract fabricator, manufactures original and replacement parts for the aircraft industry. This means their production must meet exacting jet engine specifications.

New Sciaky Counter Control

To help meet these requirements, Heintz now uses Sciaky Patented Three-Phase Resistance Welders with the new Predetermined Electronic Counter Control. This new unit provides precise control of all welder functions for absolute production consistency. All control settings are realized with extreme accuracy, and are readily reproduced at any time to duplicate previous production runs. The machine cannot deviate from its setting.

Fig. 1 Seam welding Nimonic to Nimonic on Pratt & Whitney Aircraft J-57 afterburner diffuser section.

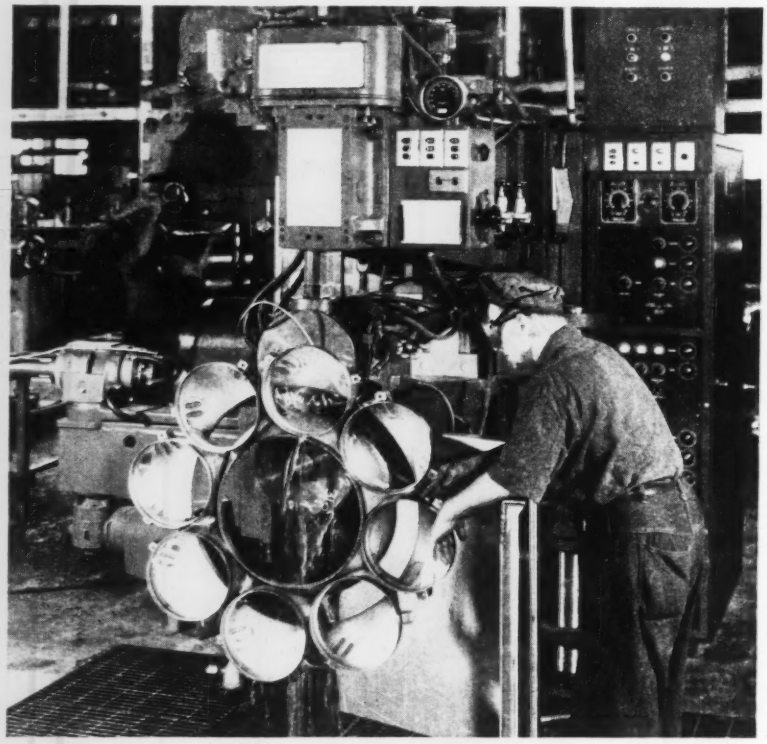


Fig. 2 Seam welding stainless to stainless on Pratt & Whitney Aircraft J-57 jet engine transition duct assembly. Note simple fixture used.

The Sciaky Predetermined Electronic Counter Weld Control is the only control of this type that has been proved in service, and the first unit of this kind has now been in use nearly two years.

How It Works

The Sciaky Predetermined Electronic Counter Control counts the cycles of power line frequency which is governed by the U.S. Naval Observatory. In predetermined absolute numbers, cycles and impulses are simply counted by a Dekatron tube to control the duration of the various welder functions. The absolute consistency of the control eliminates the need for time-consuming periodical check-out or calibration. Plug-in feature permits easy unit replacement, or addition of other control functions if required.

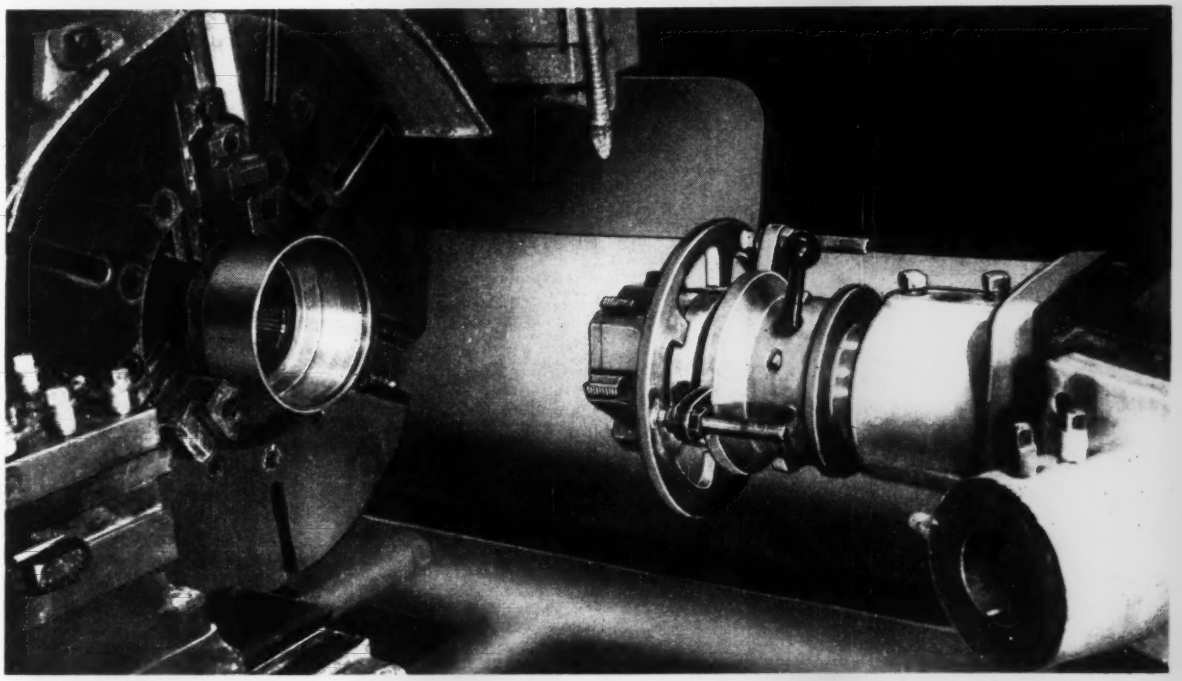
Operations Performed

Photos show typical Sciaky resistance welding applications on jet engine parts—Afterburners, Screech Screens, Engine Duct Assemblies, etc. Materials welded include Nickel Alloy, Nimonic and Stainless Steel.

Information Available

Case histories outlining the successful use of Sciaky Resistance Welding Techniques on jet engine components are available on request. Specific recommendations will be furnished on receipt of an outline of your requirements.

Write today, mentioning the information you would like to receive. There is no obligation. Sciaky Bros., Inc., 4909 W. 67th St., Chicago 38, Ill. POrtsmouth 7-5600. 62-C



TAPPING 7⅝″ threads in tough steel

Rugged construction, allowing heavy metal removal in one pass, is one reason the LANDIS 6ALT Collapsible Tap is used to thread cylinder retainer caps for heavy duty hydraulic cylinders at the Cleveland Hydraulic Co., Bedford Heights, Ohio. $7\frac{5}{8}$″ 8-pitch UN threads are tapped 2-3/16″ long in 40-50 carbon cast steel (normalized from 1600° to 1750°) to Class 2 fit.

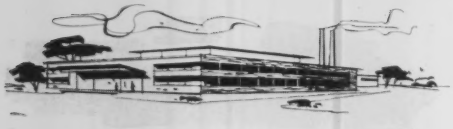
Another outstanding feature of these LANDIS Taps is the detachable head, permitting the use of tap heads of various capacities on the same body. On the 6ALT shown, five heads allow a threading range of 6½″ to 13¼″. In addition, each head has a relatively wide threading range—the 7″ head used here threads all diameters from 6½″ to 8″. As a result, minimum equipment is required for wide range coverage, low initial cost and continuing economy of tooling is assured.

For complete information on LANDIS ALT Collapsible Taps, for threading all diameters from 1¼″ to 13¼″, write for Bulletin G-94.

500

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA



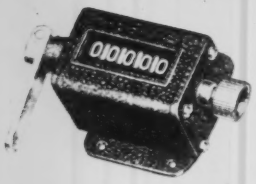
No Two Plants

are alike...

but all can count on VEEDER-ROOT

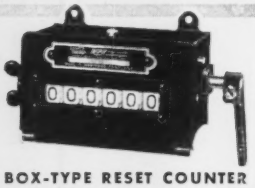
Sure, everybody's manufacturing problems are "different." But when these problems involve mechanical or electrical *Count*rol, they can *all* get the right answer from the same man . . . the Veeder-Root Distributor.

You will find that this man is tops in his field. He knows industry, and he knows how to adapt and apply standard Veeder-Root Counters to all types of production machines and processes, to give you exactly the facts-in-figures you need. If it's a question of quality, volume, cost inventory, production, wage or incentive payment, remember that *you're never sure unless you count*. And remember that the man you can always count *on* is your Veeder-Root Distributor. If you don't know who he is, just drop a line to D. G. Dresser, Veeder-Root Inc., Hartford 2, Conn.



SMALL RESET COUNTER

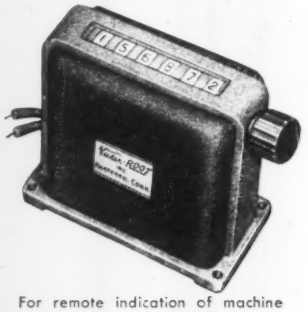
A compact, rugged reset counter for moderate duty in parts inspection, quality control, conveyors, machine tools, light presses, etc.
Dimensions: 1¾" long, $1\frac{13}{64}$" high, $1\frac{7}{16}$" wide.
Speed: Up to 1000 counts per minute.



BOX-TYPE RESET COUNTER

For punch press installations, conveyors, metal-working equipment, die casting, plastic-molding, rivet, spring and wire machining, or any installation requiring a heavy duty counter.
Dimensions: 4¼" long, $2\frac{5}{32}$" high, $3\frac{3}{8}$" wide.
Speed: 500 counts per minute.

RESET MAGNETIC COUNTER



For remote indication of machine operation from plant to office.
Dimensions: $3\frac{15}{16}$" long, 2½" high, $1\frac{5}{8}$" wide.
Speed: Up to 1000 counts per minute.
Coils: 110V-AC are standard. Other voltages are available. Panel mounting feature also available.

HAND TALLY

For quick spot-checks of production or performance.
Dimensions: $1\frac{17}{64}$" long (to end of reset knob), 1¾" deep, 2" high.
Counts one for each depression of the thumb lever, and resets to zero by a turn of the knob.

CLUTCH SPEED COUNTER

For checking to make sure that the machine is operating at the required R.P.M.
Dimensions: 3¼" long, ⅞" max. diameter. Non-Reset.
Internal clutch operates counter only when rubber tip is pressed against the shaft.

Everyone can count on

VEEDER-ROOT

"The Name that Counts"

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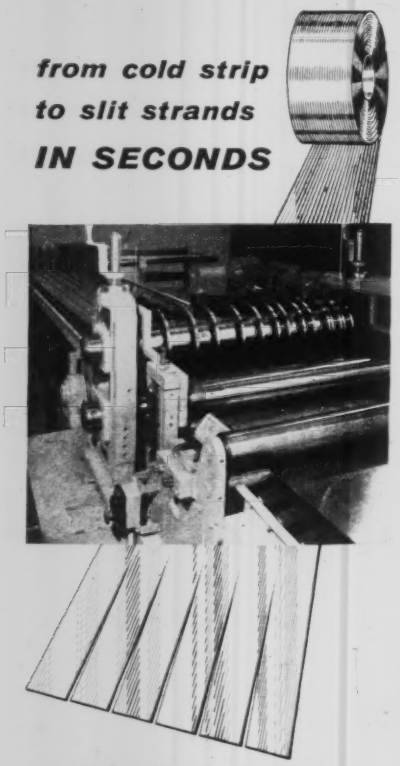
from cold strip to slit strands
IN SECONDS



YODER ROTARY MULTIPLE SLITTERS

A Yoder slitter converts mill-width coils of flat-rolled metal into many variable-width strands in amazingly short time. Speed, coupled with great accuracy and low manpower requirements, makes a Yoder slitter an important factor in keeping production and overhead costs down.

Operated by only two men, the Yoder Type 3-48 slitter illustrated is designed to accommodate standard mill-width coils up to 48 inches wide, in a variety of metals and thicknesses. The slit strand widths can be held to within a .004" tolerance.

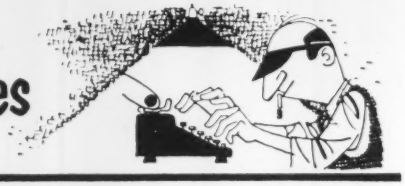
Even if your steel requirements are as little as 100 tons a month, the savings to be realized in time, manpower and raw material costs alone will pay for a Yoder slitter in the first few months of operation.

There is a Yoder slitter designed and engineered to meet your requirements, and to speed the delivery of "special" width stock in a wide range of large or small sizes. Send for your free copy of the fully-illustrated, 76-page booklet, "Multiple Rotary Slitting Lines."

THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING
ROTARY SLITTING LINES

behind the scenes



At the Copper Bar

The gentlemen who leaned against the bar were obviously chance acquaintances, but it was likewise obvious that they had stirred up a subject of mutual interest.

"Yes, indeed," the tall character was saying. "Copper artifacts have been found all over America, proving conclusively that pre-Columbian Indians were qualified coppersmiths. You see, primitive trade routes were the paths over which Lake Superior copper found its way to Florida and the West Indies—"

"I'm not interested in pre-Columbian Indians," exclaimed the fat gentleman. "What do you think of today's copper market? What's with copper?"

"That's what I have been trying to tell you, sir. It is my belief that copper . . ."

"If either of you gentlemen care to learn—ah—what's with copper," we blurted without thinking, "simply consult the Jan. 13 issue of STEEL. On Page 35, you will find an interview with Robert G. Page, president, Phelps-Dodge Co."

"Aren't the Phelps-Dodge people hot shots in the copper business?" inquired the fat man.

"Indeed they are, sir. If you would like a copy of STEEL so you might read the article, we'll be happy to send you one."

"STEEL?" echoed the fat man. "We get it all the time at the office. How else do you think I keep up on metal markets?"

Here We Go Again

Several weeks ago a letter came from George F. Weber, a supervisor in the Mercury Div. of the Ford Motor Co. Mr. Weber inquired about a puzzle that appeared here Feb. 12, 1951, and when we looked it up we could well understand why he had been thinking about it for nigh on to six years. Do any of you remember it?

In Rifle Row live five officers. They are a brigadier, a colonel, a major, a captain, and a lieutenant. Their names, not necessarily respectively, are Grenade, Howitzer, Mustardgas, Verylight, and Tank. Each officer has one, and only one, sister and each is married to a sister of one of the other officers. These particulars are available:

1. One, at least, of the brothers-in-law of Mustardgas is superior in rank to Mustardgas.
2. The captain did not serve at Gallipoli.
3. Both brothers-in-law of Howitzer served in France, as have both brothers-in-law of Tank, but neither brothers-in-law of the Brigadier.
4. Tank served in Palestine as have both his brothers-in-law, and the lieutenant has not.
5. The colonel has served in China as have both his brothers-in-law.
6. Tank served in China, as has only one of his brothers-in-law. The brigadier has not served in China, but has served with both his brothers-in-law at Gallipoli.
7. Verylight has not served in Gallipoli or in Palestine.

What is the name and rank of each of the five officers?

Proof of Readership

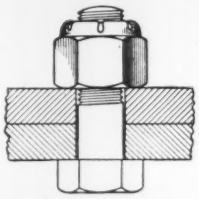
The gang at General Steel Castings Corp., Granite City, Ill., sent this picture on a Christmas card showing themselves working on our puzzles. Identified from left to right simply as Letterman, Faye, Berry, and Charlsie, they represent the most indefatigable team of puzzle-worker-outers we have ever encountered. Thanks to Charlsie, we will list this picture as Exhibit A in our attempt to prove that some persons actually read "Behind the Scenes."

Shrdlu

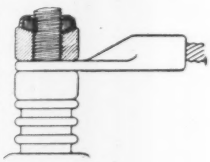
(Metalworking Outlook—Page 29)

Ten fastening problems solved by ELASTIC STOP® nuts

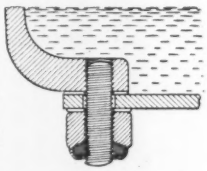
TIGHTENED AGAINST THE WORK



Vibration and impact proof bolted connections in standard applications.

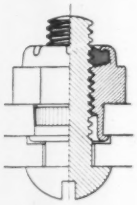


On all electrical terminals subjected to vibration in transit or operation, and for any electrical or electronic assembly where positive contact must be maintained.

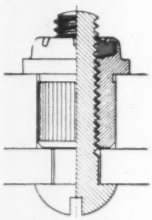


To seal bolt threads where leakage past stud threads must be prevented.

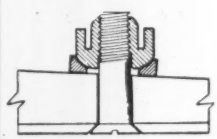
FOR MANY SPECIAL FUNCTIONS



Blind fastening applications where nut is "clinched" into sheet metal . . . becoming self-retaining as well as self-locking.

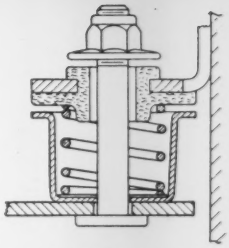


To eliminate drilling and tapping and provide steel thread strength for soft metals, an ESNA spline nut is pressed into a bored hole in casting.

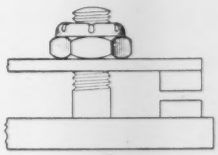


Simplified self-aligning self-locking fastener for bolting two non-parallel surfaces.

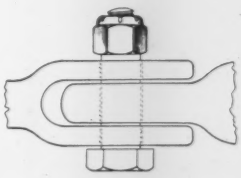
LOCKED ANYWHERE ON THE BOLT



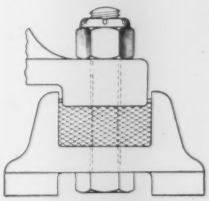
Spring-mounted connections or dynamic balancing, where nut must stay put yet be easily adjusted. (Flanged face eliminates need for extra washers.)



On make and break adjustment studs where accurate contact gaps must be maintained. Note "thin" height design for limited clearance.



For bolted connections requiring predetermined play.



For rubber-insulated and cushion mountings where the nut must not work up or down.

HOW THESE NUTS SOLVE SO MANY FASTENING PROBLEMS, ELIMINATING EXTRA PARTS AND OPERATIONS...

The red locking collar of an ELASTIC STOP® nut grips bolt threads with a perfect fit that will not loosen under severe vibration or stress reversals, and seals against liquid seepage. By bringing nut and bolt metal thread flanks into firm contact it eliminates wear producing axial play. The elastic locking action of the insert-type stop nut does not distort or gall bolt threads. It is reusable many times.

Send for the following free information: Elastic Stop nut bulletin; Rollpin® bulletin. Or enclose a drawing of your product for specific self-locking fastener recommendations. Write to Dept. N30-160.

ELASTIC STOP NUT CORPORATION OF AMERICA
2330 VAUXHALL ROAD, UNION, NEW JERSEY

our research is your reward

SELAS continuous strip annealing boosts eastern steel mill capacity 400,000+ tons/year

This steel mill is meeting current production demands and setting the stage for the future with its installation of four 15-ton/hr Selas single-pass annealing lines.

Cooperative research with Selas and years of operating experience in continuous strip heating at the mill indicated that a 500 fpm strip speed provided the most economical operation to meet the current requirements of this steel producer. High prime yield, relatively few interruptions, ease of mechanical alignment, lower maintenance, were other considerations which dictated the use of this single-pass, direct-fired concept of annealing.

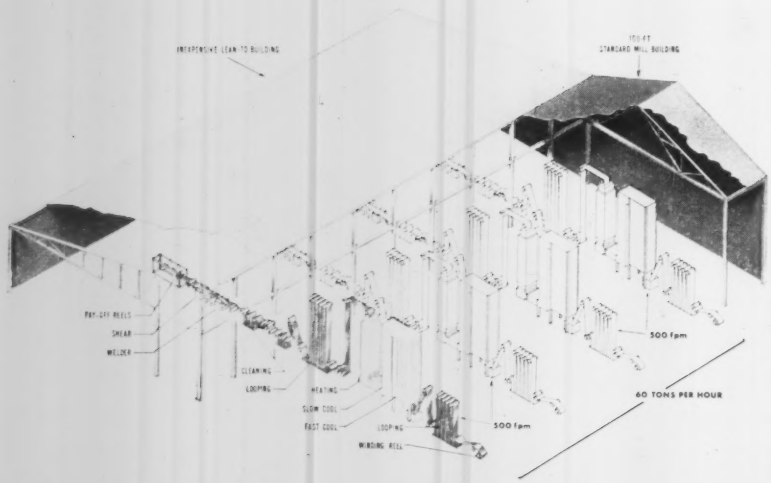
To meet desired increased capacity of 60 tons per hour, four such lines were installed *across* a normal mill building, thereby saving space and avoiding special plant construction.

After a year of production operation, the mill reports these advantages from the Selas multi-line installation:

- Continuous hour-after-hour production of prime strip
- Great flexibility of scheduling to meet simultaneously the needs of several customers
- Simplified material flow patterns with lighter material handling equipment
- Economical, easily-maintained equipment of simple design
- Provision for market trend toward wider, lighter-gauge strip
- Operating ease, especially in change-over, start-up and strip-rethreading
- Minimum number of passes with few rolls (none in high temperature section) for high mechanical and electrical efficiency
- Conservative production rating—already exceeded—that can be significantly increased, if desired, by simple, inexpensive alteration to furnace

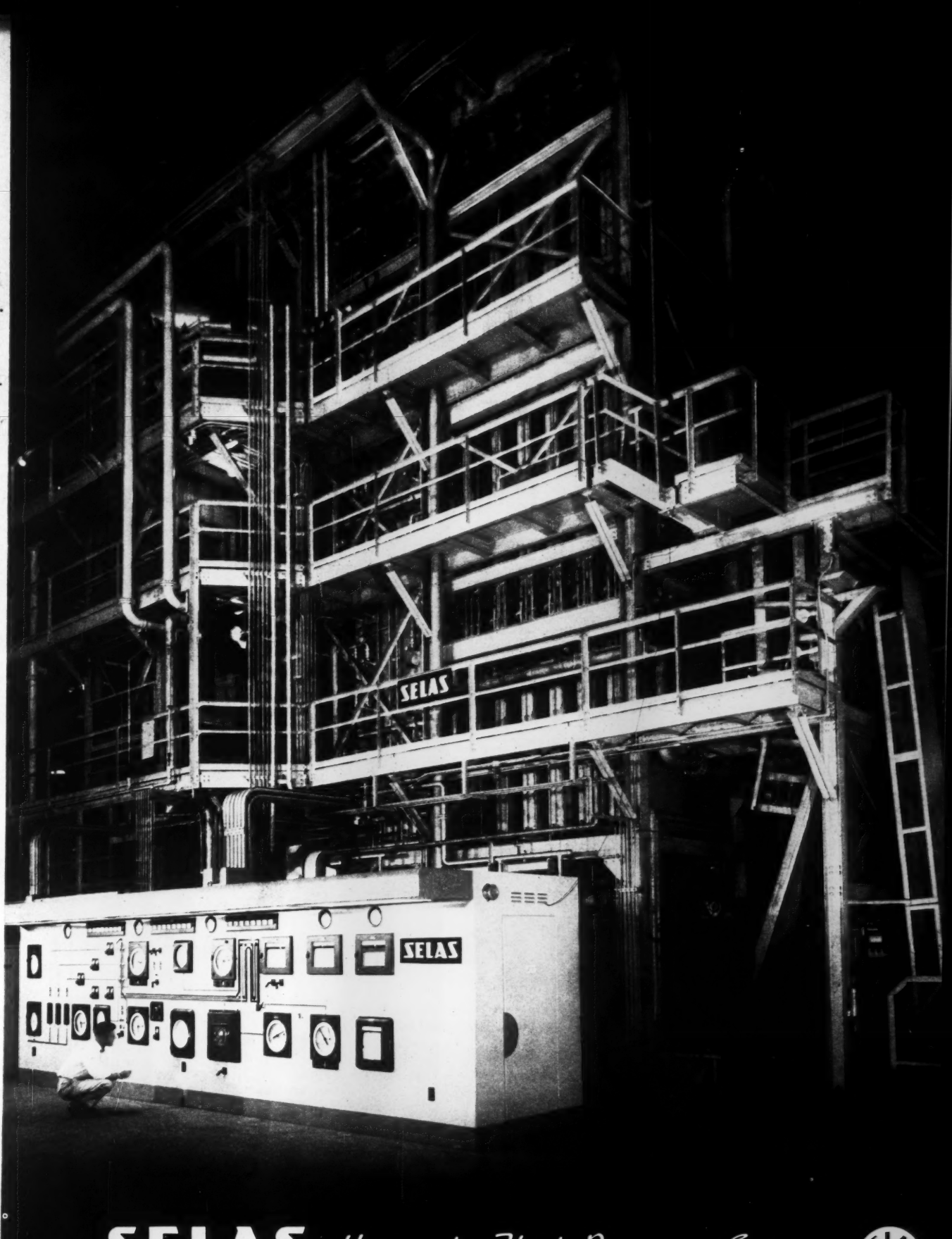
In another mill, one Selas line is annealing 30 tons of steel strip per hour. Still higher production rates are readily attainable using single-pass, direct fired heating. Our engineers will be glad to discuss how Selas Gradiation® methods can be tailored to your strip processing needs. Address Dept. 21, Selas Corporation of America, Dresher, Pa.

Gradiation is a registered trade name of Selas Corporation of America.



The four Selas lines, including cooling sections and looping towers, are installed in 100-ft conventional mill building. Handling equipment at each end of line is installed in relatively inexpensive lean-to-type structures so that flow of material is across building. Arrangement provides for economical expansion when required.

Compact Selas Control Cubicle saves valuable floor space and permits easy access to instruments, while graphic front panel functionally delineates process and control system of this continuous annealing line. It presents operating information more accurately and pictorializes process conditions and functioning of the production line. The flow diagram shows strip passing through Selas single-pass vertical furnace (located at center of panel) through controlled-cooling section (at right). Gas combustion control and temperature, strip speed, and atmosphere composition indicators are related to the diagram at points of operation. Heat input is controlled by integrating strip speed, fuel input and strip temperature measurements.



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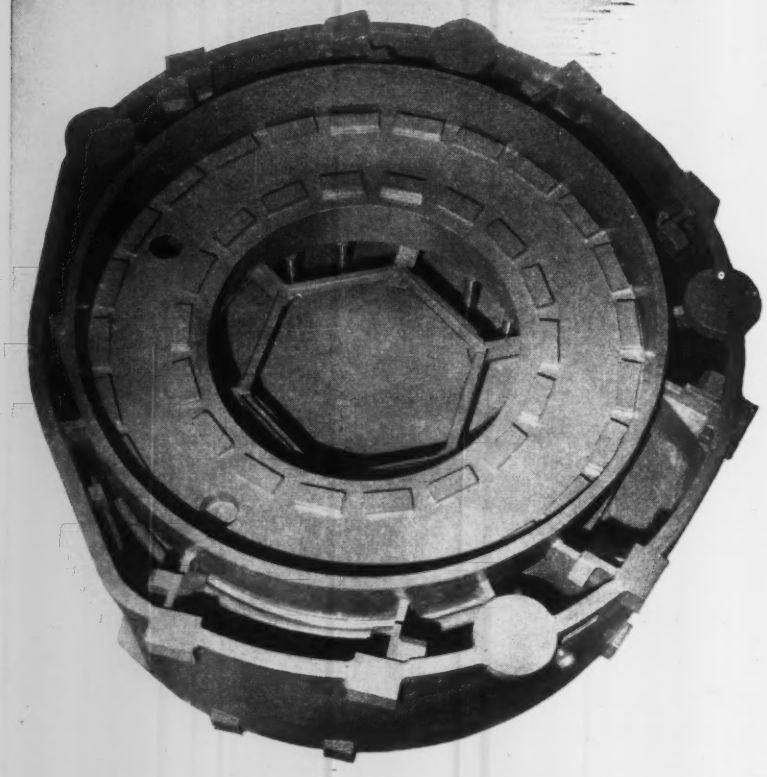

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LETTERS
TO THE EDITORS

First Magazine To Be Opened

Please send an extra copy of your article, "Pilot Runs Up Your Odds" (Dec. 16, Page 102).

Your articles are timely, interesting, and effective. You may be sure that STEEL is the first magazine I open on Monday morning with the knowledge that something of value is sure to be available.

A. O. Payne
Chief Engineer
A. Y. McDonald Mfg. Co.
Dubuque, Iowa

Company To Reprint Story

Please send an extra copy of your article, "Have Enough Salesmen?" (Dec. 30, Page 35). May we reproduce for use within our organization?

Stanley Brooks
Manager, New England Sales
H. W. Butterworth & Sons Co.
Div. of Van Norman Industries Inc.
Bethayres, Pa.

• *Permission granted.*

Wants Production Idea Article

Please forward several copies of your Production Ideas series article No. 16, "Swagers Point, Form, Assemble" (Dec. 9, Page 157).

Samuel B. Dunne
Plant Manager
Murray Tube Works Inc.
Green Lane
Elizabeth, N. J.

Accurate Picture of Wages

It is my opinion that we must correct a misconception which has done more than its share to increase the cost of doing business today.

It's the way people talk and write about hourly wages. We read that a machinist earns $3.72 an hour. The fact is—he receives considerably more.

At the Timken Co., for instance, the average employee is paid an additional 73 cents per hour in the form of fringe benefits. So our $3.72 machinist is actually paid $4.45. We always use the total earnings per hour in our conversation, our correspondence, our news release, employee publications, or any other time we talk about wages.

I think that if more companies would adopt this practice, business would present a fairer and more accurate picture of wages actually paid. Fringe benefits are wages. I am convinced it would help employees to realize that they are paid much more than their union leaders

(Please turn to Page 12)

Self-aligning

FOR LONGER LIFE

Not even misaligned shafts or supports impair the efficiency of this easy-to-mount LINK-BELT roller bearing

THE equipment manufacturer seeking lower manufacturing costs plus the ultimate in free-rolling efficiency need look no further than this Link-Belt roller bearing.

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- **COMPACTNESS** offers design flexibility.

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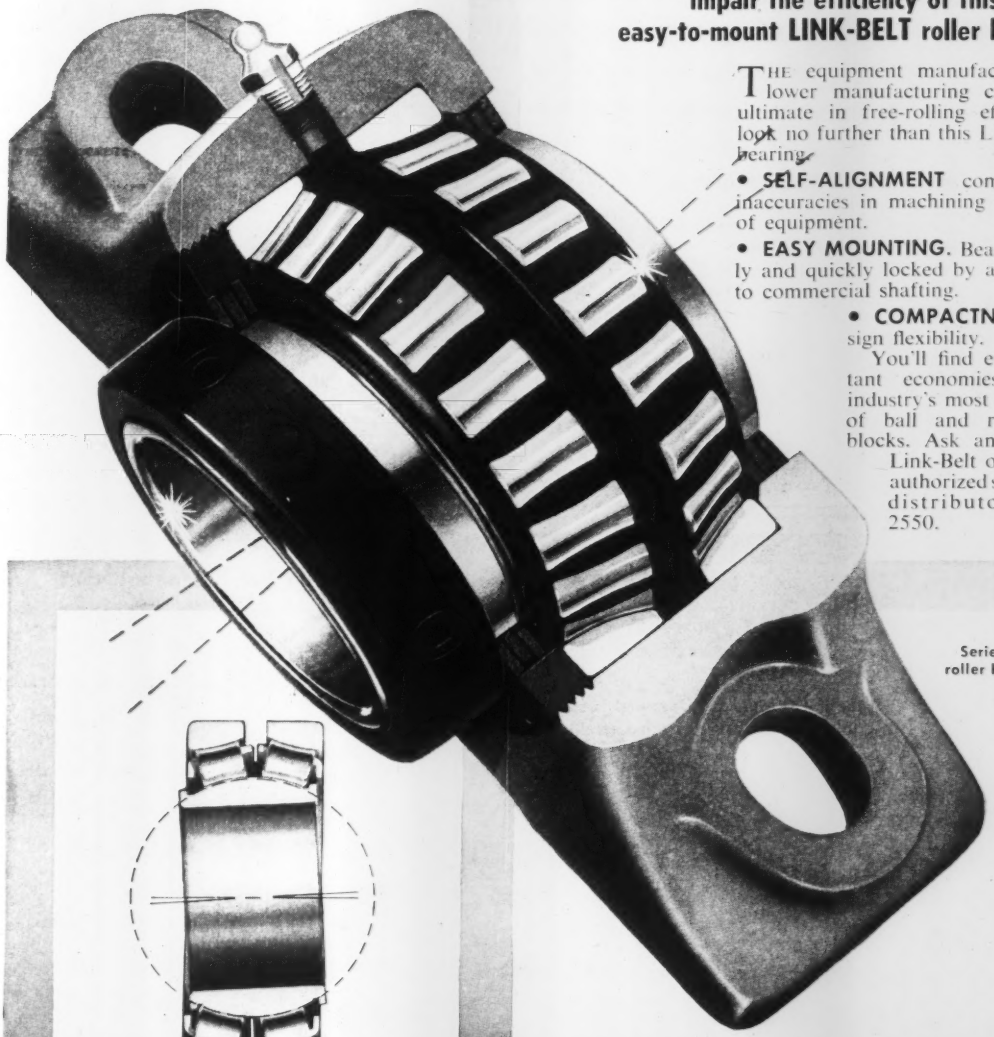
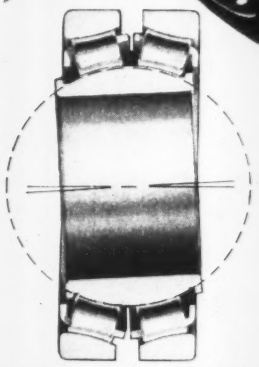


Series 400 roller bearings



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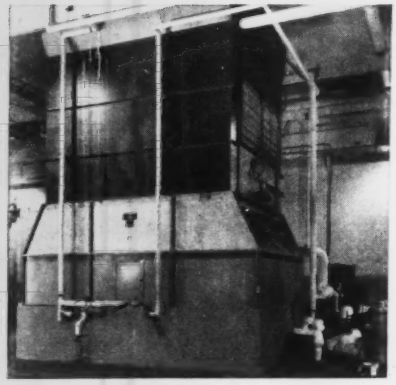

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LETTERS

(Concluded from Page 10)

want them to think they are paid.

We're asking others to help in creating this awareness. We feel that it's a service to our employees. We think it will create a more favorable climate of opinion among the general public. We hope it will help control the wage spiral and wage-price inflation.

William E. Umstattd
President
Timken Roller Bearing Co.
Canton, Ohio

Lauds Clarity of Expression

I have been following your 1957 Program for Management with a great deal of interest. You are to be congratulated on the excellent presentation of the subjects, layout, clarity of expression, and subject matter.

As a keen student of works management, I would like an extra copy of these 10 articles. I am anxious to have the articles in one folder for what I consider will be frequent reference.

D. N. Davies
Thorpe Field Farm
Thorpe Hesley
Rotherham, Yorkshire
England

Request by Employee Researcher

If you still have a supply of the article, "Give Employees Their Say" (Dec. 9, Page 116), I would like to have a copy.

Roy R. Reynolds
Supervisor
Employee Relations Research
Kaiser Steel Corp.
Oakland, Calif.

Handbook for Management

Your Program for Management articles are looked forward to each month. They make an excellent handbook for the management of any firm. Please send a copy of No. 4, "Inventory Management" (May 13, Page 109). My copy seems to have gotten away from me before I could save it to put with the other articles.

J. D. Sowles
Office Manager
Framingham Welding & Engineering Corp.
Framingham, Mass.

Article Interests Metallurgist

I have read with considerable interest the article, "How To Get More from a Spheroidizing Furnace" (Dec. 9, Page 208). I would appreciate receiving a copy.

O. E. Cullen
Chief Metallurgist
Surface Combustion Corp.
Toledo, Ohio

New Request for 1955 Report

In your Sept. 19, 1955, issue, there was a Program for Management article, "Value Analysis: Equal or Better Performance at Lower Costs" (Page 101). We should like to have your approval to duplicate 500 copies for distribution to the participants in a Better Methods and Work Simplification training program at Sonoco Products Co., Hartsville, S. C.

S. J. Fecht
S. J. Fecht & Associates
Chicago

• *Permission granted.*

Columbia Tool Steels for 1957-58
with A.I.S.I. Identification and Type Classification of Tool Steels

GRADE	Type	Identifying Elements, in Per Cent C	Mn	Si	Cr	Ni	V	W	Mo	Co	Cb
HOT WORK TOOL STEELS — TYPE SYMBOL H											
H1-H19, INCL., CHROMIUM BASE TYPES (H1-H10 AND H17-H19 UNASSIGNED)											
FIREDIE-CASTDIE	H11	.35	—	—	5.00	—	.40	—	1.50	—	—
ALCODIE	H12	.35	—	—	5.00	—	.40	1.50	1.50	—	—
VANADIUM CASTDIE	H13	.35	—	—	5.00	—	1.00	—	1.50	—	—
	H14	.40	—	—	5.00	—	—	5.00	—	—	—
	H15	.40	—	—	5.00	—	—	—	5.00	—	—
	H16	.55	—	—	7.00	—	—	7.00	—	—	—
H20-H39, INCL., TUNGSTEN BASE TYPES (H27-H39 UNASSIGNED)											
	H20	.35	—	—	2.00	—	—	9.00	—	—	—
FORMITE 2	H21	.35	—	—	3.50	—	—	9.00	—	—	—
	H22	.35	—	—	2.00	—	—	11.00	—	—	—
	H23	.30	—	—	12.00	—	—	12.00	—	—	—
FORMITE 3	H24	.45	—	—	3.00	—	—	15.00	—	—	—
	H25	.25	—	—	4.00	—	—	15.00	—	—	—
CLARITE J	H26	.50	—	—	4.00	—	1.00	18.00	—	—	—
CLARITE HW	H26	.50	—	—	4.00	—	1.00	18.00	—	—	—
H40-H59, INCL., MOLYBDENUM BASE TYPES (H40, H44-H59 UNASSIGNED)											
	H41	.65	—	—	4.00	—	1.00	1.50	8.00	—	—
	H42	.60	—	—	4.00	—	2.00	6.00	5.00	—	—
MOLITE HW 10	H43	.55	—	—	4.00	—	2.00	—	8.00	—	—

Third of a Series of Six Charts Covering A.I.S.I. Tool Steel Type Classifications

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NEW!...

At W-K-M Division of A-C-F Industries, Inc., Houston, Texas, Gulfcut Heavy Duty Soluble Oil has been used extensively on turret lathes for threading, boring, facing, turning, and grooving operations. This Gulf customer says: "Gulfcut Heavy Duty Soluble Oil gives us long tool life and excellent finishes."

Erich Brenner, Foreman at W-K-M, informs Jeff Bolling, Gulf Sales Engineer, about the excellent results obtained with Gulfcut Heavy Duty Soluble Oil.

Gulfcut Heavy Duty Soluble Oil

Now you can make heavier cuts... at higher speeds... with longer tool life... even in turning such alloys as chrome-nickel steels!

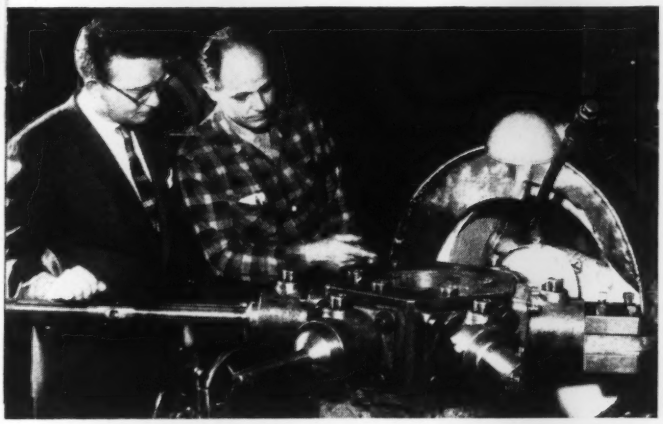
Here's a completely new emulsifying oil—developed over the past 6 years in Gulf's research laboratories! Gulfcut Heavy Duty Soluble Oil performs efficiently even on low machinability metals. It has a record of proven performance on tough jobs where most soluble cutting oils have trouble meeting requirements.

Gulfcut Heavy Duty Soluble Oil is economical, too: an average mixture of 1 part to 25 parts of water gives high cooling efficiency, and superior lubrication. In many field tests, it has performed very well even in mixtures of 1-to-150!

Will not separate or gum!

This shop-proved new soluble cutting oil won't separate or gum in wheels, slides, ways or other machine parts. It contains a potent rust inhibitor which provides greater protection against rust and corrosion. Has excellent emulsion stability, even in hardest water. Has high surface-wetting properties for more effective cooling. Contains powerful anti-foaming and anti-welding agents. Also contains an effective germicide to help eliminate rancidity and odor.

Is your production hampered by your present soluble oil? When turning metals of low machinability, are you forced to take light cuts, at slower speeds and feeds? To improve production, get better surface finishes, longer tool life, lower overall operating costs—try new Gulfcut Heavy Duty Soluble Oil. Call the Gulf Engineer, at your nearest Gulf office—or write for illustrated booklet.



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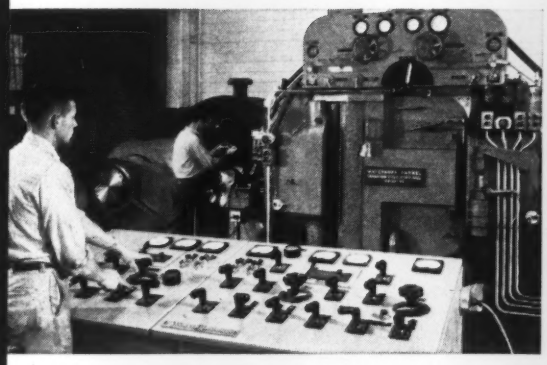
Westinghouse drives and control help . . .

Eastern Stainless Steel Corporation increase production



Extensive experience enabled Westinghouse engineers to provide both unusual control accuracy and drive dependability required for this new 49″ Sendzimir mill. The new mill demanded drives and control for high versatility and watch-like precision to produce a wider range of light-gauge stainless steel.

The reel motors are supplied by individual generators and are accurately controlled by Westinghouse Magamp* regulators for speeds up to 700 ft./min. Power is supplied by a 3125-kw M-G set to motors which total 3750 hp.

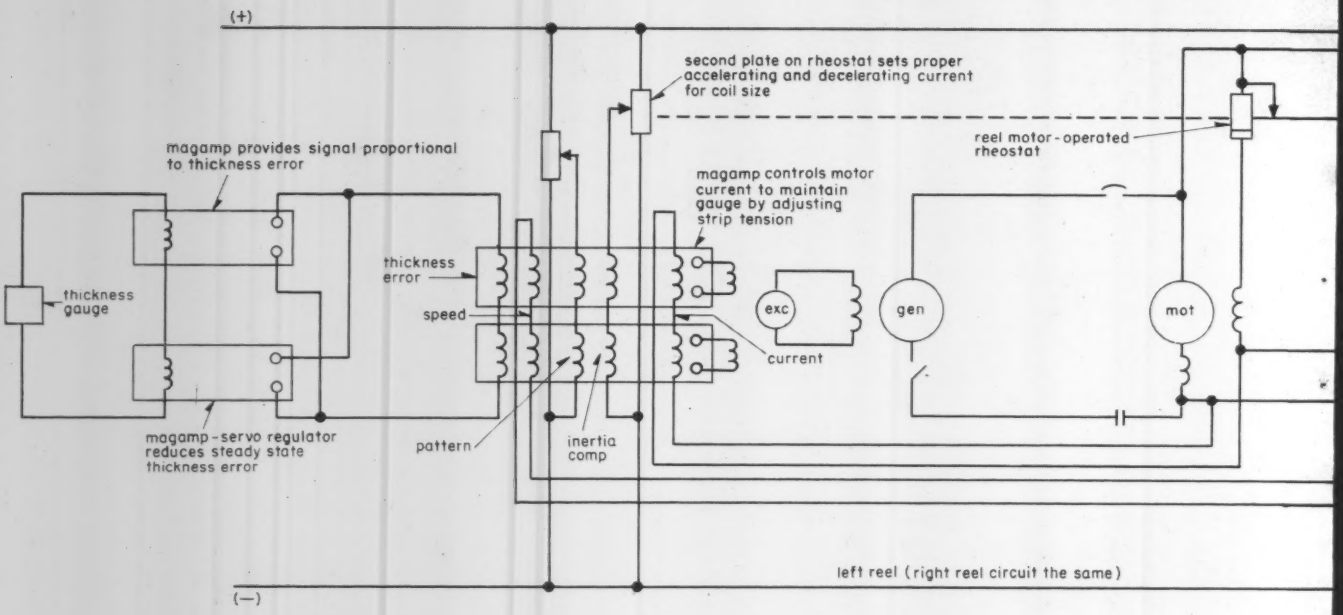
Today, developments in mill drives enable Westinghouse to help you gain closer tolerances with automatic control *this way* ▶

*Trademark

MP-3059

Operating control is centrally located on this console.

YOU CAN BE SURE...IF IT'S **Westinghouse**



Increase strip accuracy to ±.0001″

. . . with Westinghouse automatic gauge control

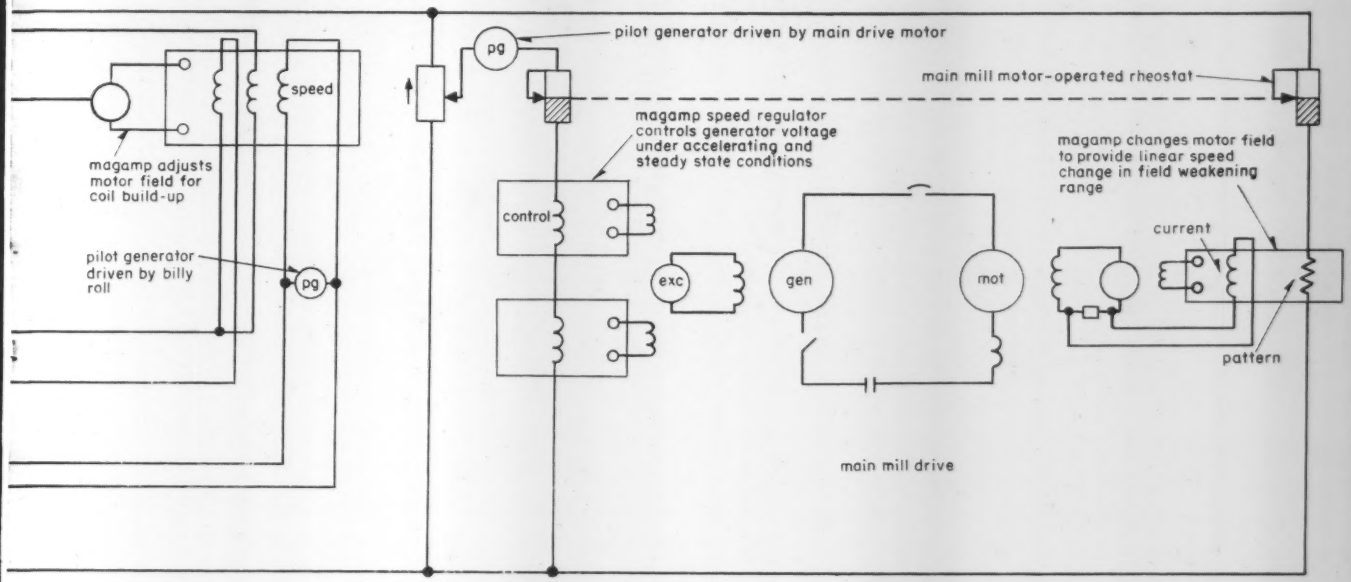
Increased accuracy and flexibility are engineered into Westinghouse drive systems for any single-stand, cold-reversing mill . . . such as shown above. Developments in automatic gauge control and Magamp regulator systems make it possible for you to maintain extremely close tolerance of ±.0001″. And, at the same time, you have ease of adjustment for quick change from one product to another. Here's how Westinghouse control and main drive equipment give consistant, high quality results:

Automatic gauge control circuit varies the strip tension to maintain uniform thickness of finished strip as measured by thickness gauge.

For mills equipped with regulating tensiometers, the signal from the tensiometer maintains constant tension by regulating the reel motor current. A tension rheostat furnishes the pattern field adjustment.

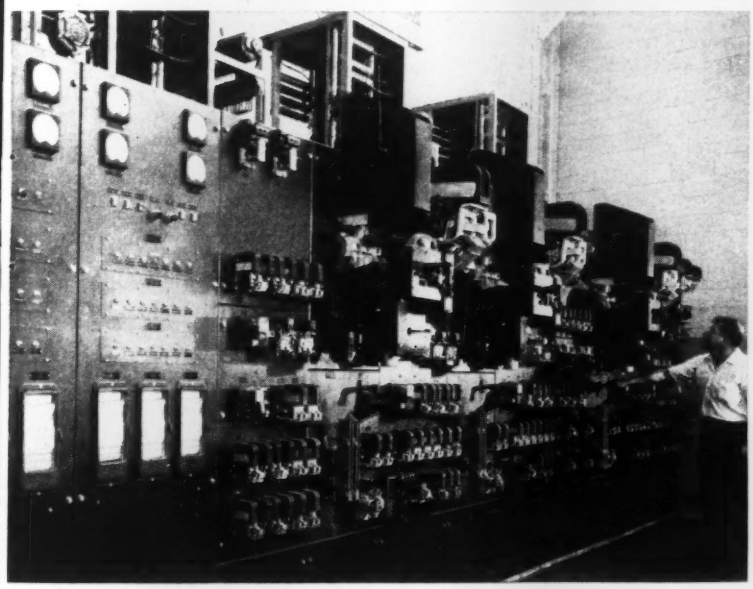
Magamp regulator system compensates for coil build-up by automatically regulating the speed of reel motors. Magamp's high amplification and extremely short response time assure accurate generator voltage control for optimum overall performance.

YOU CAN BE SURE...IF IT'S Westinghouse

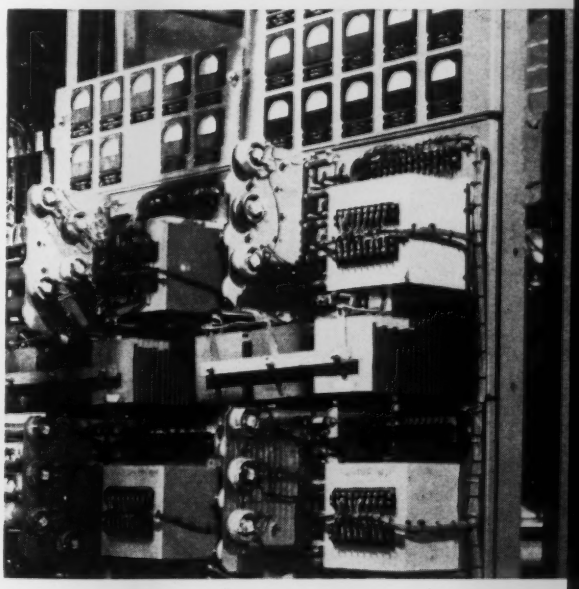


Cold reversing mill system-diagram shows control that can be realized with Westinghouse motors and control components.

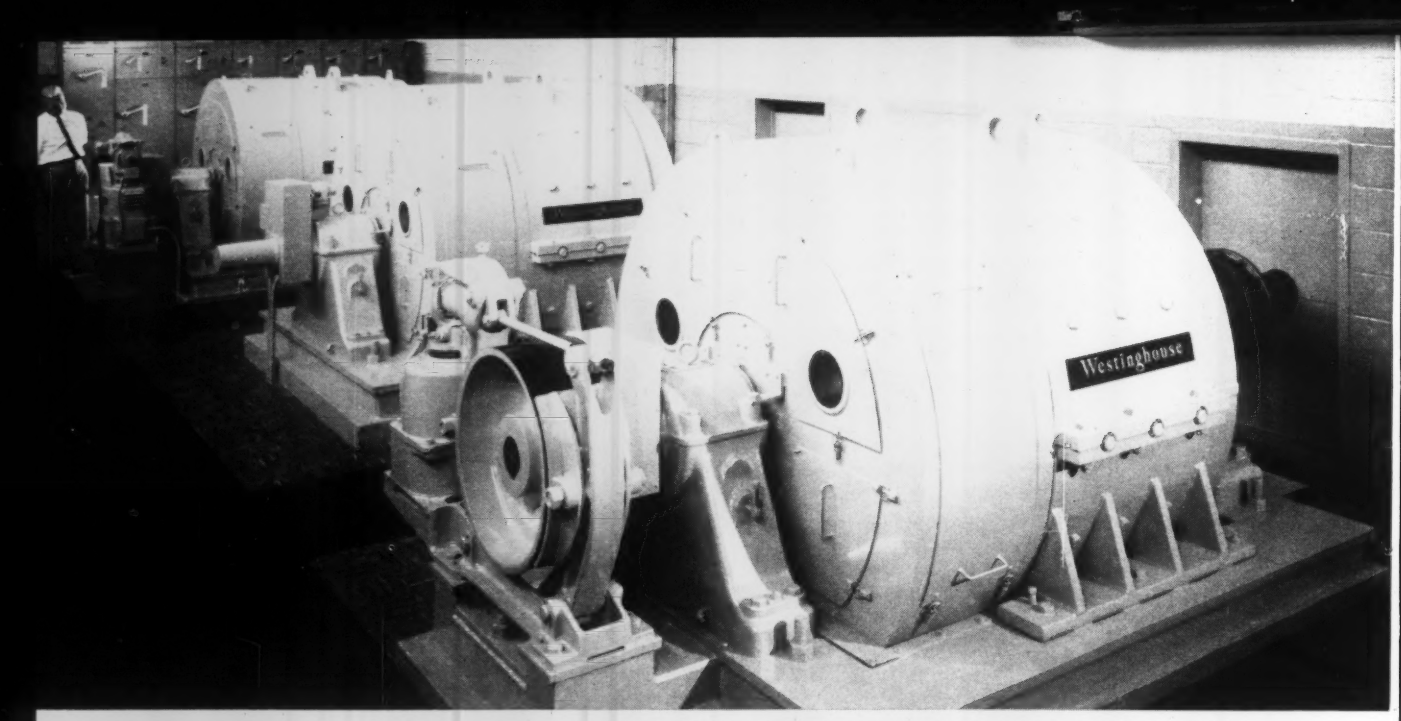
Main drive control panels with main circuit breakers (top) and memory-type fault finder on left. System faults are indicated instantly and recorded to make trouble shooting easy.



Magamp regulators are mounted in the rear of the main drive.

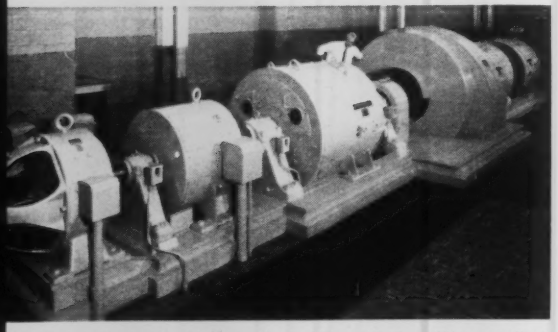


for dependable drive power . . .



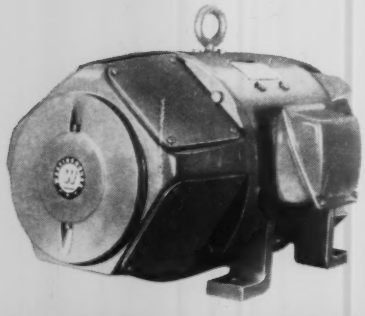
Three 1250-hp 200/600-rpm motors are interchangeable for main drive and reels on typical Sendzimir mill. Oversize bearings insure longer bearing life and minimum maintenance.

Westinghouse drives are tailor-made to meet your specifications



Power for main drive motors of Sendzimir mill is supplied by a 3125-kw M-G set with three 1000-kw main drive generators and 3000-hp synchronous driving motor.

Life-Line® "H" motors with silicone insulation achieve up to 55% reduction in armature inertia by decreasing armature size. With commutating ability increased 35%, the Life-Line "H" assures faster reversing performance.



Westinghouse main drive equipment supplies the power needed for heavy reduction on Sendzimir and other cold rolling mills. Armature coils on all large rotating equipment are protected with Thermalastic® Insulation for three times greater dielectric strength under varying temperature conditions.

Rubber-mounted sight-glass windows on generators and motors provide for easy inspection of commutation under operating conditions. Commutator covers are easily opened for routine maintenance. Full-length commutating poles provide improved commutation under varying load conditions.

Westinghouse steel mill experience in all types of drive and control problems can help in your next planning or design session. A Westinghouse team will accept unit responsibility and work with your engineering staff. Contact your Westinghouse sales office or write: Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Penna.

YOU CAN BE SURE...IF IT'S

Westinghouse

CALENDAR
OF MEETINGS

Jan. 13-17, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac and Statler Hotels, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Jan. 13-15, American Management Association: Special conference on developing new products, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y. Secretary: Andrew P. Donovan.

Jan. 16-17, National Industrial Conference Board Inc.: General session for all associates, Hotel Commodore, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Jan. 17, Malleable Founders' Society: Semiannual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Jan. 19-22, Institute of Scrap Iron & Steel Inc.: Annual meeting, Eden Roc, Fontainebleau, and Deauville Hotels, Miami Beach, Fla. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: Edwin C. Barringer.

Jan. 20-21, Compressed Gas Association Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Association's address: 11 W. 42nd St., New York 36, N. Y. Secretary: F. R. Fetherston.

Jan. 20-22, Truck Trailer Manufacturers Association: Annual meeting, Palm Beach Biltmore Hotel, Palm Beach, Fla. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 20-23, American Road Builders Association: Annual meeting, Sheraton-Park Hotel, Washington. Association's address: 600 World Center Bldg., Washington 6, D. C. Executive vice president: Louis W. Prentiss.

Jan. 21-22, Steel Shipping Containers Institute Inc.: Winter meeting, St. Regis Hotel, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Jan. 26-30, Associated Equipment Distributors: Annual meeting, Conrad Hilton Hotel, Chicago. Association's address: 30 E. Cedar St., Chicago 11, Ill. Executive secretary: P. D. Herman.

Jan. 26-Feb. 2, Association of Steel Distributors Inc.: Convention, Algiers Hotel, Miami Beach, Fla. Association's address: 29 Broadway, New York 6, N. Y. General counsel: Morris Rosoff.

Jan. 27-28, Industrial Heating Equipment Association: Annual meeting, Penn Sheraton Hotel, Pittsburgh. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Robert E. Fleming.

Jan. 27-30, Plant Maintenance & Engineering Show and Conference: International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 30-31, Steel Plate Fabricators Association: Annual meeting, Roosevelt Hotel, New Orleans. Association's address: 105 W. Madison St., Chicago 2, Ill. Secretary: J. Dwight Evans.

Feb. 3-7, American Institute of Electrical Engineers: Winter general meeting, Statler and Sheraton-McAlpin Hotels, New York. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Feb. 4-6, Society of the Plastics Industry Inc.: Reinforced plastics division conference, Edgewater Beach Hotel, Chicago. Society's address: 250 Park Ave., New York 17, N. Y. Executive vice president: William T. Cruse.

Feb. 5-7, Alloy Casting Institute: Midwinter meeting, Ponte Vedra Club, Ponte Vedra Beach, Fla. Institute's address: 286 Old Country Rd., Mineola, N. Y. Executive vice president: E. A. Schoefer.

New
ARMSTRONG
Armide CARBIDE INSERT
TOOL HOLDERS

The advantages of
Carbide Cutters with
the Multiedged "throw away" ARMIDE inserts

Write for
Bulletin CIT

NEW ARMSTRONG Armide Carbide Insert Tool Holders hold multiedged, throw away Armide inserts. They end tool grinding and reduce down time. After an edge dulls, a slight turn of the clamping screw permits rapid indexing of the insert to a new cutting edge. Triangular inserts have 6 cutting edges; square inserts have 8 edges. They are available in three grades—Armide 350, 370, or 883.

ARMSTRONG Armide Carbide Insert Tool Holders are furnished either "Right Hand" or "Left Hand" in the two styles illustrated, each in 3 sizes.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
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Buy ARMSTRONG TOOLS from your Industrial Distributor

Coming January 20 in

STEEL

How the Redstone Missile Is Fabricated

The first article ever to appear which gives the types of metal used and fabrication techniques needed on a ballistic missile will appear next week in STEEL.

It will take the reader into Reynolds Metals Co.'s plant at Sheffield, Ala., where the airframe for the Redstone is made. Featured will be revelations about a production procedure for the missile shell that many manufacturers of civilian equipment might well envy.

The above advertisement, reproduced from a recent issue of the Saturday Evening Post, kicked off Speed Queen's year-long observance of their Golden Anniversary and introduced the "Royal Pair"—first automatic washer and dryer with a stainless steel tub and a stainless steel dryer drum. Speed Queen is a division of McGraw-Edison Company, Ripon, Wisconsin.

Steps

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Out with Republic Stainless

Utilizes the plus-values of Republic ENDURO® Stainless Steel to gain a competitive edge

Speed Queen, first to use a stainless steel bowl-shaped tub in an automatic washer, now has designed an automatic dryer with a stainless steel drum.

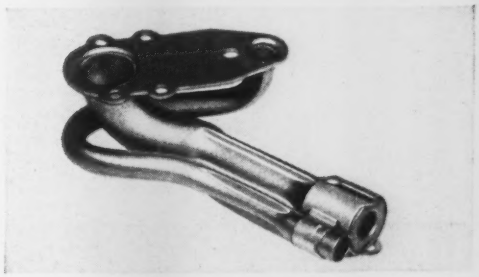
Fabricated from Republic ENDURO® Stainless Steel, the tub and drum in Speed Queen's Royal Pair provide maximum protection for clothes in the washing and drying operation.

Stainless offers the greatest resistance to rust and corrosion of any commercial metal. And because ENDURO is solid stainless steel, there is no surface to wear away. There's never any danger of flaking, chipping, peeling or cracking. ENDURO's smooth, hard surface protects the finest and sheerest of fabrics.

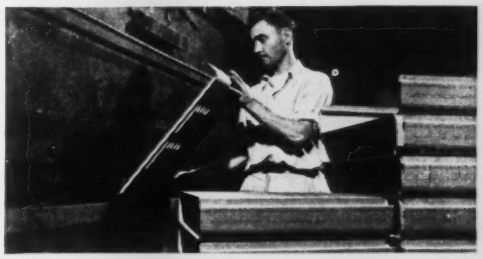
The inertness of stainless is another plus-value that Speed Queen has built into its new washer and dryer. It is neither affected by nor does it react with dyes, bleaches, soaps or detergents. That is one reason why textile manufacturers and commercial laundries have been using ENDURO equipment for years.

What about your product that needs to gain a competitive edge? Use Stainless to obtain freedom of design. Its extremely high strength-to-weight ratio permits use of thinner, lighter sections to reduce weight and bulk. Use Stainless for trim and brightwork. It has the strength to withstand the abuse of every day use. Use Stainless for functional parts. Strength, heat-resistance and corrosion-resistance make it the perfect metal for any application involving heat or cold. Use ENDURO to give your product sales appeal.

Republic metallurgists and engineers are available to assist you in selection, application and processing of stainless. No obligation for their services, just mail the coupon. Or contact your Republic ENDURO Stainless Steel Distributor.



RANGE BURNER MANUFACTURER STEPS OUT with Republic ELECTRUNITE® Welded Steel Tubing. Harper-Wyman Company uses it in forming lightweight, easy-to-clean venturi burner tubes. The company subjects ELECTRUNITE to a hairpin bend of 1¼-diameter radius, then a four-way crimp, followed by punching, notching and welding. Uniform, predictable ductility avoids stretch and collapse as tubing is severely bent and formed. Close tolerances of O.D. and I.D. avoid die and mandrel troubles. Our engineers will help you design ELECTRUNITE into your product to speed production, cut costs and improve performance. Mail the coupon for facts.



SOFT-DRINK DISPENSER MANUFACTURER STEPS OUT with Republic Electro Paintlok®. Ideal Dispenser Company uses Electro Paintlok for cabinets to provide an excellent paint-adhering surface even after severe forming operations. According to Ideal, "hot room" tests have proved it the most economical base material under temperature and humidity variations found in any part of the world. Sheets are shipped from the mill in prime condition for painting. For some products, only the final finish need be applied for full protection and attractive appearance. Send coupon for full details.

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☐ ELECTRUNITE Steel Tubing

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4 INTERLOCKED CRANES HANDLE 100-FOOT TRUSSES

Tramrail Transfer Cranes Provide Speed and Economy for Dominion Bridge

DOMINION Bridge Co., Ltd., is the largest steel fabricating company in Canada. It is engaged in many phases of steel fabricating work including that of building heavy overhead cranes. For this reason, it knows the need of quality materials handling equipment and how to recognize it.

Their new Mount Dennis plant in Toronto was built primarily for the fabrication of heavier plate and welded steel structures. It has a completely electrified Cleveland Tramrail system in the preparation bay which can handle loads up to 20 tons when its four cranes are worked together.

The cranes are 5 tons capacity, 3-runway, 36 and 40 feet long. They operate individually, or two cranes on adjacent runways can be locked together as a unit. Then both cranes travel together on the two 3-track runways and respond to the push-button station, suspended from the hoist carrier, like a single crane. The ability to use two or four cranes together is extremely helpful when handling large fabricated structures like the 100-foot truss illustrated.

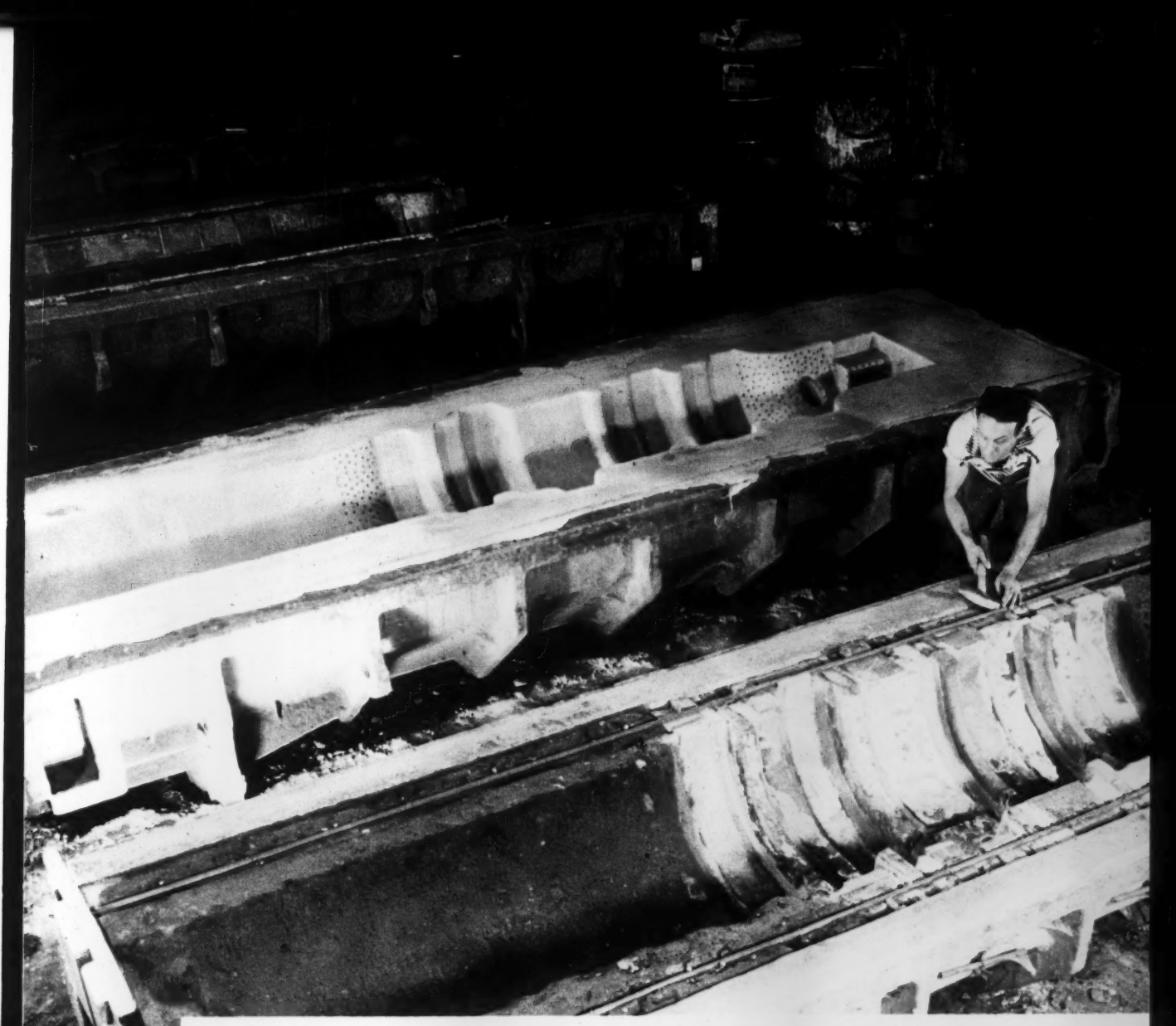
Write for free Engineering and Application Booklet No. 2008.

Packed with valuable information.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7831 E. 290 ST. • WICKLIFFE, OHIO



Man with a chill

With light taps of his hammer, one of Mack-Hemp's skilled foundrymen coaxes a cast iron chill into place in the sand of a mold for a large steel mill roll. His concern for its exact position stems both from personal pride of workmanship and from the long tradition of painstaking precision which he is helping to maintain... a tradition that extends back over 150 years.

This combination of individual skill backed by long experience is the secret of Mackintosh-Hemphill quality; it's the prime reason why *you get more tonnage from the rolls with the striped red wabblers.*

MACKINTOSH-HEMPHILL
Division of E. W. BLISS Company
Pittsburgh and Midland, Pa.

MACKINTOSH-HEMPHILL DIVISION · PITTSBURGH, U.S.A.

BLISS

A coachman's native gold buttons

and a golden opportunity for your plant

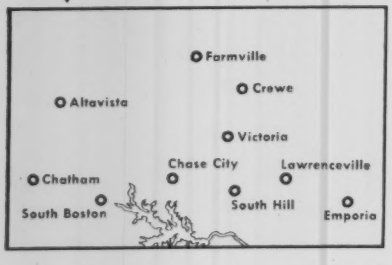
Captain Booker struck it rich! In 1832, twin veins of gold came to light on his Southside Virginia plantation. And the Captain celebrated by having big buttons of solid native gold made to adorn his coachman's uniform.

Today, Southside Virginia gold is a blend of unusual competitive advantages for your plant. Industries here have nearly doubled in two decades. Yet you can still draw on large reserves of man and woman power to help you profit by this area's forest and mineral resources, and nearby supplies of coal and other raw materials.

Central location, top transportation favor you here. Midway between Northeast and Southern markets, you can choose from five mainline railroads plus through highways and nearby deep-sea ports.

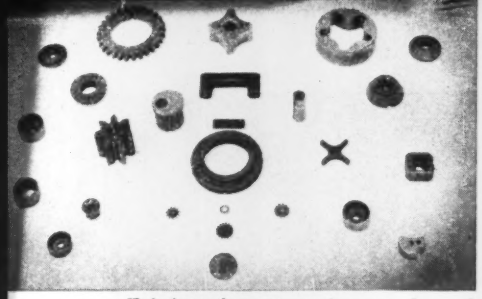
To power your growth, Vepco's modern network now has 640,000 kilowatts of new generating capability under construction—building toward a total of 2,171,900 kw in 1960. For confidential site finding help in this land of fine industrial water, mild climate, thrifty government and pleasant living . . . write, wire, or phone Vepco, serving "The Top of the South" in Virginia, West Virginia and North Carolina.

SOUTHSIDE VIRGINIA

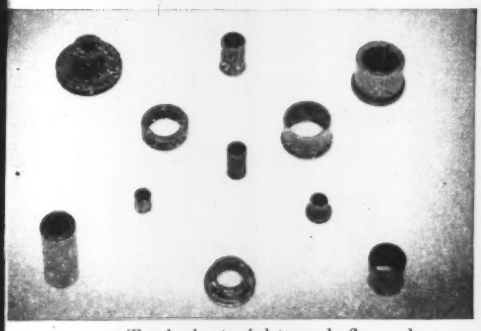


VIRGINIA ELECTRIC and POWER COMPANY

Clark P. Spellman, Director—Area Development, Electric Building, Richmond 9, Virginia • Phone: MIlton 9-1411

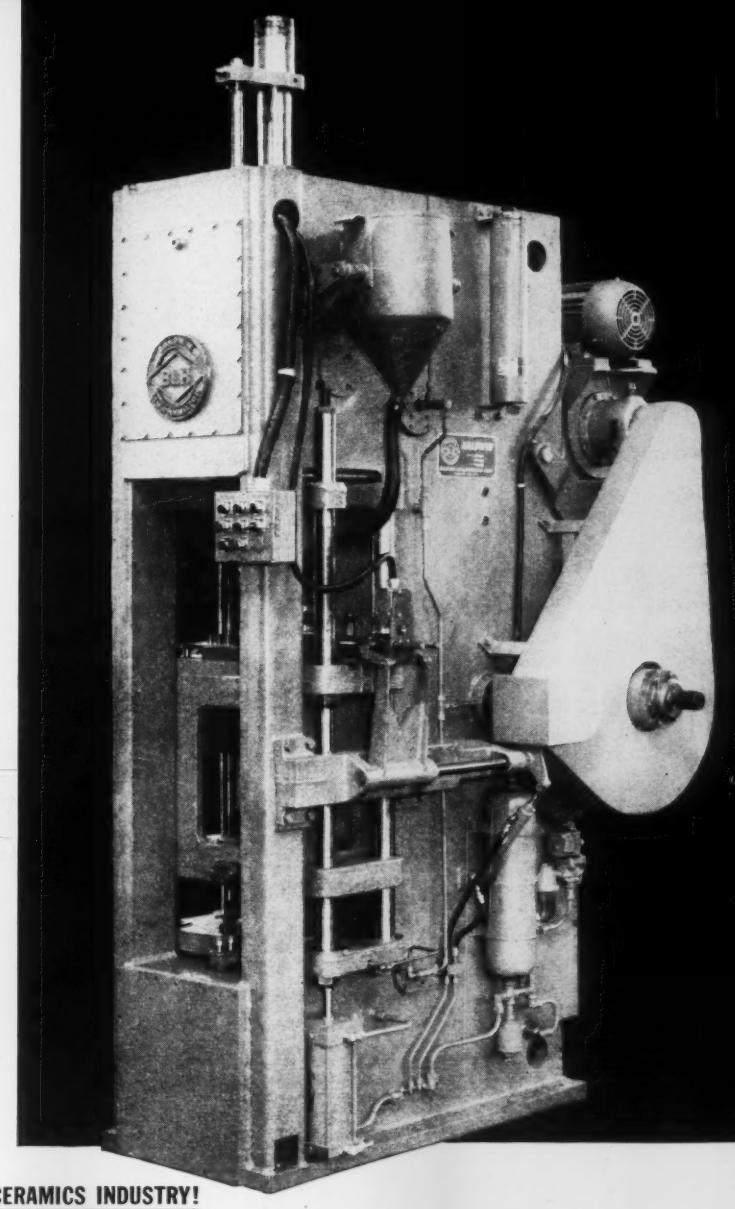


Fabricated parts and gears formed on Baldwin Compacting Presses.



Typical straight and flanged powdered metal bushings made on Baldwin Compacting Presses.

Other parts being made at United States Graphite on Baldwin presses. The double hub and counterbored parts are test pieces. Others are production items.



ATTENTION POWDERED METALS AND CERAMICS INDUSTRY!

Baldwin's new, low-cost compacting press specifically designed to meet your needs

Baldwin-Lima-Hamilton Corporation's 100 years' experience and know-how in designing and building hydraulic presses has been incorporated into the new 50W low-cost compacting press.

Its 1-piece frame and floating die deliver the same uniform pressure, the same rigid 4-point guiding, as our regular heavy duty 4-column hydraulic presses. The 50W is designed for versatility—extra motions may be added as requirements become more complex, without the need for additional machining.

Rated pressure of the Baldwin Model 50W is 50 tons, with a 25-ton ejection capacity. Stroke is adjustable through its entire fill range of 0 to 4½ in. For complete details, including specifications, write to the Hamilton Division, B-L-H Corporation, Hamilton, Ohio.

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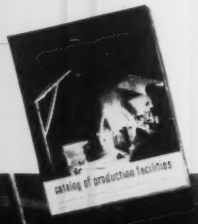
BALDWIN BLH LIMA-HAMILTON

Extruded Shape Formed and Flash Butt-Welded . . . the Low-Cost Way to Make this 268 lb. Stainless Steel Ring

By using extruded or mill-rolled shapes and flash butt-welding, American Welding can frequently help customers slash production costs of their circular products over other methods of manufacture. Savings in expensive metals are substantial, plus sizable reduction in machining time. And where some of the more difficult metals to weld — such as titanium, aluminum, zirconium, stainless and heat-resistant alloys — are required, American Welding has the special knowledge and equipment to do those difficult jobs to your specifications.

The use of flash butt-welded rings, bands, and assemblies has saved millions of dollars for jet engine manufacturers . . . why not investigate what economies it can mean to you. If it's circular and of metal — call American Welding first!



NEW PRODUCTS CATALOG AVAILABLE. Write today for 20-page catalog illustrating the many types of circular products American Welding can form, weld and machine for you.

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Metalworking Outlook

January 13, 1958

Ike Sees Better Year Ahead

Administration circles remain confident of a sharp business spurt in 1958. So the President has offered Congress a balanced budget of about $74 billion for fiscal 1959, including more than $40 billion for direct defense spending. Additional revenues from a revitalized economy, argues Ike, will pay for the spending boost without a tax increase. His request for another $1.26 billion for defense in fiscal 1958 (to bring total defense spending this fiscal year to $38.9 billion) also reflects his confidence.

Defense Orders Pick Up

With the President's request (Congress will pass it without a hitch), you'll see total Defense Department orders climb to about $23 billion in fiscal 1958, about 50 per cent more than the value of those placed last fiscal year. The additional money will be for missile launching sites, Strategic Air Command dispersal, and a speedup in missile research and development. Little of that money will be translated into hardware to help metalworking in 1958, but the funds for fiscal 1959 should start to take effect the last few months of calendar 1958. Military aircraftmakers, for example, expect plane production to increase significantly. The Navy's recent fighter aircraft orders have fostered a rosier outlook. Increased B-52 production for SAC is also coming.

Democrats Don't Fear Deficits

Congress has already started to clamor for an even bigger defense budget. The Democratic majority openly admits willingness to push Ike's plans over the deficit point. They have the ball these days. They count on a touchdown in 1960 to vindicate their calls for defense spending of up to $45 billion a year. Watch this backfield lead the attack: Sen. Lyndon Johnson (Tex.) on space projects; Sen. Henry Jackson (Wash.) on missile-firing submarines; Sen. Stuart Symington (Mo.) on airpower. Sen. Harry Byrd (Va.) will act as quarterback, but he may not call all the signals for spending as much money as his teammates favor.

Unions Lose Ground in Clerical Drive

Unions may be losing ground in organizing clerical workers, a National Office Management Association survey indicates. Only 8.1 per cent (the same as a year ago) of 6000 participating U. S. firms are all or partially unionized in the whitecollar ranks. Taking into account all the steam unions have put into organizing clerical people in the past year, that represents a labor defeat. In Canada, only 8.1 per cent (vs. 10.8 per cent a year ago) of participating companies are fully or partially unionized.

Strike Losses Hit Postwar Low

Fewer workers were idled and less time was lost because of strikes last year that in any postwar year, says Bureau of Labor Statistics. About

Metalworking Outlook

16 million mandays of idleness — some 0.1 per cent of the total time worked by the nonfarm labor force — resulted directly from all strikes in effect in 1957. That compares with 33 million mandays and 0.3 per cent of the total in 1956. New strikes dropped from 3825 in 1956 to 3600 in 1957, one of the lowest figures since World War II. Workers involved numbered 1.4 million in 1957, a postwar low.

Coming Up: Aircraft Negotiations

Watch aircraft industry labor negotiations in March and April for the first important indication of how the 1958 bargaining wind is blowing. The unions involved, primarily the United Auto Workers and International Association of Machinists, want cost-of-living escalator clauses, in addition to wage boosts. Labor will make such demands despite steadily falling employment.

Slight Gains for Electrical Industry

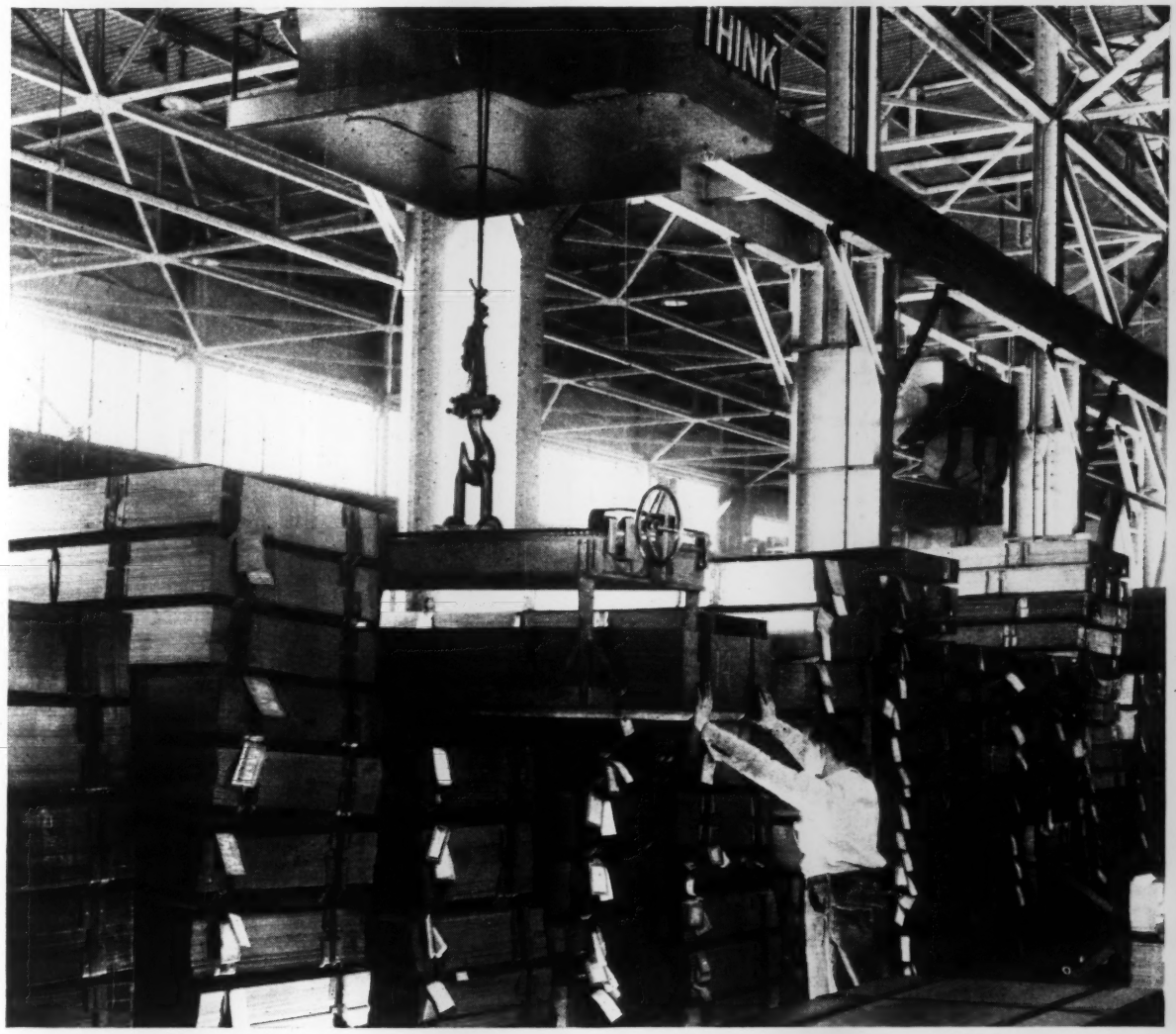
The electrical manufacturing industry will turn out $21 billion worth of products in 1958, compared with $20.9 billion in 1957 and $20.6 billion in 1956, predicts the National Electrical Manufacturers Association. NEMA sees modest increases in these areas: Appliances; illuminating equipment; building equipment and supplies; insulated wire and cable; generation, transmission, and distribution equipment; miscellaneous products. Declines are seen for signal and communication equipment, industrial apparatus, and insulating materials.

Revisions in Stockpiling?

Look for the special Stockpile Advisory Committee to report to Gordon Gray, defense mobilizer, this week. It may recommend discontinuing the long term buying program and orderly disposal of some materials in the five-year program. As of last June 30, inventories for 63 of the 76 strategic and critical materials were full (only $300,000 worth of material was needed to bring that part of the stockpile's value to $3.4 billion); a five-year emergency supply had been met for 47 items (worth $1.9 billion, with another $900,000 needed); $1.1 billion worth of minerals were in the long term stockpile, with room for another $2.7 billion.

Russia Plans Big Things in Steel by '70

Russia plans to boost its iron ore production from 85.9 million net tons in 1956 to 229.4 million in 1970. Pig iron output is scheduled to increase from 39.4 million tons to 104.5 million tons. Ingot steel production of 132 million tons is envisioned for 1970, compared with 53.5 million tons in 1956.



Sheet and strip—more than 20 kinds—and Ryerson delivers fast!

You name it—Ryerson has it.

Hot and cold rolled sheets. Pickled and oiled sheets. Tight-coated galvanized and galvannealed sheets that won't flake or peel when you form them. Stainless sheets. Ryex expanded metal. Perforated sheets. And many others, all in a wide range of gauges and pattern sizes.

Need special sizes? Modern equipment cuts them to your specifications quickly and economically, in blanks, straight lengths or coils.

Ryerson also offers a complete line of metalworking machinery and tools to meet virtually every requirement.

When you want sheet and strip, give Ryerson a call—it pays!

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Principal Products: Carbon, alloy and stainless steel—bars, structurals, plates, tubing, industrial plastics, etc.

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The PROOF of DSC STEEL is in its PERFORMANCE ON YOUR JOB

DSC *Specialized* STRIP

helps hold down your job-run costs

SPECIAL "SPEC" STRIP—All DSC STRIP is special-purpose steel . . . only some is more so. Examples—specially restricted thickness tolerance (often mighty tight); special satin finish (not too satiny, not quite bright); special temper (not limited to standard "2," "3," "4" or "5").

HOW Specialized STRIP PAYS OFF—Helps sustain steady, high-speed production; increases yield; minimizes rework expense; prolongs tool and die life; gives closer control of unit costs; improves product quality; protects anticipated profits.

TYPICAL CASES—A maker of precision engine bearing-backs specifies specially restricted thickness tolerances (in a wide range of gauges) in combination with special satin finish. Purpose: to reduce fabricating costs, conserve costly alloy lining materials; prolong bearing life; safeguard engine performance.

Another DSC STRIP application (identity withheld at customer's request) is an uncomplicated, little stamping. Here —*level gauge* and *even temper* permit automatic feed on a battery of four high-speed presses operated by one man. Result: man-hour costs minimized; jamming (as with less uniform steel) avoided; tools and presses protected; production delays eliminated.

JOBS WE LIKE TO TACKLE:

- **LEVEL GAUGE—standard or restricted tolerance (electronically rolled and controlled)**
- **HEAVY GAUGE (up to 3/16") or LIGHT (down to about .010")**
- **EVEN TEMPER—controlled to suit your job**
- **HIGH CARBON SPRING STEEL or LOW CARBON STRIP**
- **SATIN FINISH—controlled to suit your end-use**
- **DEEP ROLLED RBF—suitable for chrome plating (The sure working steel with eye-appeal)**

SPECIALIZED SERVICE, TOO—On new applications the first step is to get the job-facts. Your DSC Customer "Rep" does that. In certain cases we like our operating people to meet yours . . . at your pleasure, of course. That's usually a big help in selecting the raw steel and in deciding on processing procedures that best fit your job. Then we follow up regularly to make sure the strip does what you expect of it.

DELIVERY?—NAME YOUR OWN LEAD TIME—WE'LL SCHEDULE TO MEET IT

Our job is to help you with yours

How about calling a DSC Customer "Rep" . . . today?

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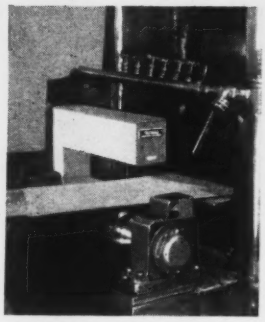

THE ELECTRONIC GAUGE

THE THICKNESS RECORDER

PICTURED ABOVE ARE TYPICAL DSC "TOOLS" FOR PRODUCING DSC SPECIALIZED STRIP

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35TH ANNIVERSARY YEAR — DETROIT DSC STEEL

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Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon
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MILL DIVISION: DETROIT, MICH., HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

Three Steps to Profit

An obviously despondent reader wrote us last week. How, he wanted to know, can a man make a profit when most everyone knows that volume will be lower, that wages will go up, and that buyers simply won't stand for price increases.

The tone of his letter implied that somehow the whole situation was our fault and that we had better come up with a pretty good answer.

We went to thirty of the most thoughtful production and administrative management men we know in the metalworking industry. We asked how they plan to build their profit power in 1958. They gave us three answers:

1. By trimming off the fat.

In a boom, every company acquires a lot of fat and the stupidity that goes with it. In a recession, even a gold-plated one, such flab is too heavy to carry. What we save in rendering it off should make our profit picture look pretty good.

Specifically, we're going to repeal Parkinson's Law in our shop. (Empire builders take heed!) We also think that overhead offers some tremendous opportunities.

2. By marketing.

We think our big profit possibilities in 1958 lie in improving our marketing setup. We're making marketing responsible for profits. We're introducing marketing at the design and product planning stage and will produce only what our marketing men find the buyers will buy—at a fair profit.

We'll get to know our customers better than we have in years, and we'll have an opportunity to help them cut their costs.

3. By lowering unit production costs with more efficient equipment.

Our ability to market effectively is dependent on our costs. Although we have purchased a lot of new capital equipment the last few years, we're going to buy more—not to expand but to increase our efficiency.

Right now, we're setting up a program to lower our unit production costs. We will get some new equipment—primarily designed to make present facilities work better.

We cannot afford not to buy new production equipment, but it will have to justify itself in lower unit production costs.

Those three answers, with minor variations, were heard over and over again. Our editors call them the Three Steps to Profit.

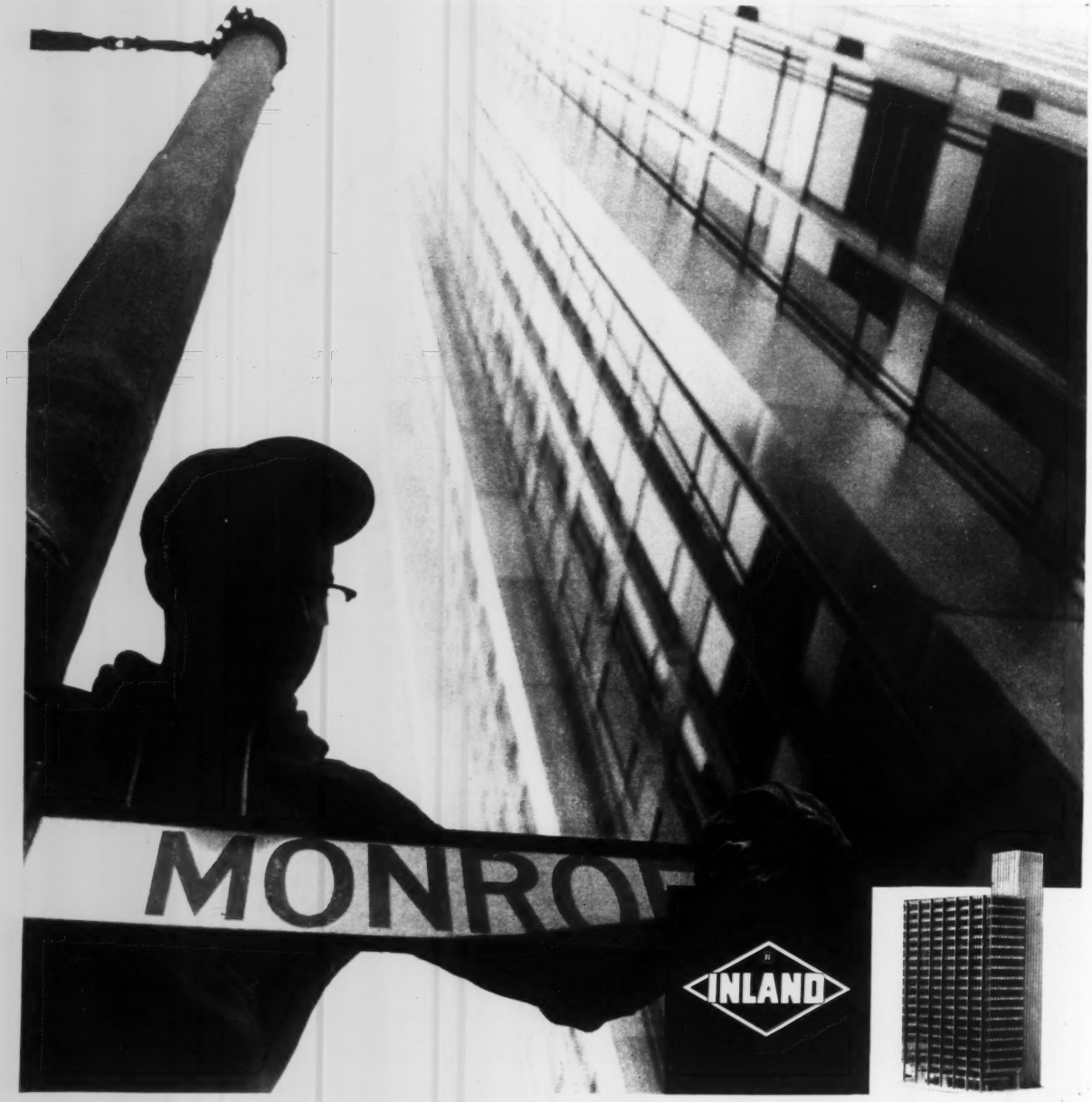
We think they'll help our despondent reader.

Walter J Campbell

EDITOR

New location for a tradition

The address is 30 West Monroe Street in Chicago. It's the location of the brand new Inland Steel Building, open for business this month. Here, you can get prompt answers to your questions about steel . . . deliveries, quality, application. The men who work here have the answers and authority to act, and are anxious, as usual, to help you. The surroundings are new but the desire to serve the needs of midwestern steel users remains the same.



INLAND STEEL COMPANY • 30 West Monroe Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul • Davenport • St. Louis • Kansas City • Indianapolis • Detroit • New York

COPPER'S PROBLEM*

Greater production .... with less demand .... forces prices down .... and cuts profits

	(Refined output-tons)	(Deliveries to fabricators-tons)	(Cents per lb)			(1st three quarters) 1956	1957
1957	1,600,000	1,300,000	27.00	(Dec. '57)	Kennecott	$115,978,457	$64,999,680
1956	1,580,387	1,465,999	36.00	(Jan. '57)	Anaconda	85,028,092	34,980,127
1955	1,467,448	1,446,354	46.00	(Jan. '56)	Phelps Dodge	68,424,037	35,814,278

*Figures are for U. S. only.
Source: Copper Institute and STEEL estimates.

Producers Plan a Comeback for Copper

They'll count on product promotion and growth in major markets, especially electrical, to spearhead the return. As a result, long term outlook is promising

SLUGGISH buying and a 19 cent-a-pound price drop in the last 18 months have combined to cut net profits of copper producers by almost 50 per cent (see table above).

They see these basic reasons for the metal's lack of muscle: 1. Product promotion has been given little more than lip service by major producers. 2. Production has far exceeded consumption.

Background—Between 1940 and 1956, copper was in short supply. Two wars and a rising civilian economy dictated industry expansion. During the Korean War, the U. S. government encouraged growth programs here and abroad.

By 1955, annual U. S. mine capacity shot up to 1,014,000 tons. It climbed 11.4 per cent in 1956 to 1,130,000 tons and another 5.3 per cent in 1957 to 1,190,000 tons. Free World capacity kept pace: From 3,011,000 tons in 1955 to 3,505,000 tons last year.

The Copper Institute reports that Free World refined production jumped from 2,424,802 tons in 1951 to 2,987,160 tons in 1956. Last year's world production should total about 3 million tons. Domestic production should be 20,000 tons above the 1956 figure, or about 1.6 million tons.

Focal Point — Rising production is copper's biggest problem. Consumption in 1957 wasn't too bad. World-wide deliveries to fabricators registered around 2,873,000 tons, compared with 2,832,978 tons in 1956. Industry sources estimate consumption to be 20 per cent above this figure because of inventory liquidation.

The strength in consumption has been overseas rather than in the U. S. Producers report a gain in foreign sales in 1957. Probable reason: The electrification boom in Western Europe.

Domestic shipments are down. Final delivery figures should show 1957 at 1.3 million tons, vs. 1,465,999 tons in 1956. Reason: Slumps in key consuming industries like housing, autos, and appliances.

World-wide overproduction and the slump in home demand have dropped the domestic primary price to 27 cents a pound, down 9 cents from the year ago figure, and 19 cents below the June, 1956, price.

Solution—Producers say there's only one immediate way to create more buying interest and firm the price: Trim production.

Domestic production curtailments announced during 1957 amounted to around 13,000 tons monthly. Kennecott Copper Corp., the latest to join the parade, cut domestic output by 12 per cent (3800 tons monthly). Another 8500 to 10,000 a month will be siphoned off the domestic market this year by the government, which is committed by contract to take the output of several small mines.

Cutbacks have also been made overseas by such firms as Katanga, the Rhodesian Selection Trust, Cerro de Pasco Corp., and Howe Sound Co. But metalmen don't believe the cuts will be sufficient because of growing production capacities. This year you may see curtailments in Chile, more cutbacks in Africa, and further slashes in domestic output.

Stocks—Output will have to be

pruned substantially for producers to eliminate their mounting inventories. According to the Copper Institute, world refined stocks in the hands of producers stood at 221,331 tons at the end of 1955. They climbed to 354,420 tons in 1956 and may have reached 428,000 tons in 1957.

U. S. stocks were at 61,554 tons in 1955 and 120,645 tons in 1956. By August, 1957, they had reached 192,931 tons, but by year's end, they had about 160,000 tons.

The rise in producers' stocks parallels a dip in customer inventories. Many consumers have been working down stocks, buying only enough to supplement inventories. Says Roy H. Glover, chairman, Anaconda Co., New York: "It's fairly evident that customers have looked to inventories for about 20 per cent of their requirements since September, 1956."

While production cutbacks may solve copper's short range problem, metalmen admit the only long term solution is greater sales through aggressive promotion of the metal. Says one spokesman: "Copper companies have been too production-minded and not enough promotion-minded." Proof: It's estimated that in 1957 the big three copper producers spent $8 million for promotion, vs. about $25 million spent by the top three aluminum companies.

Free World Copper Reserves

	(In tons)
Chile	49,670,000
U. S.	42,640,000
Northern Rhodesia	25,000,000
Belgian Congo	20,000,000
Peru	12,560,000
Canada	5,000,000
Mexico	3,840,000
Miscellaneous*	6,000,000
Total	164,710,000

*Includes smaller mine reserves within and without the U. S.

Source: Copper & Brass Research Association and copper producers.

Minuses—Product promotion and market research and development stand little chance of reaching maturity soon, copper people agree. Most technological studies are aimed at better ways to make copper, not better or new products.

Plusses—Some progress has been made. Copper is being pushed for such uses as radiant heating, air conditioning, and printed circuits. A leading independent brass mill says it intends to take on "so-called marginal products which have not been produced by the mill before."

American Brass Co., Waterbury, Conn., cites these new products: Phosphorized anodes for industries that require high quality plating and electrodeposition of copper; superfine grain brass which reduces expensive finishing costs as much as 50 per cent; a new phosphor bronze with a high fatigue limit.

Adds an American Brass spokesman: "We have made a distinct drive to capitalize on a trend among leading architects to use copper-base alloys for architectural trim. Modernization of large institutional structures such as banks, office buildings, and other commercial establishments represents a new and challenging market with substantial tonnage possibilities. We have also introduced a relatively thin-wall copper tube for sanitary drainage systems."

Says T. E. Veltfort, managing director, Copper & Brass Research Association, New York: "A new use of copper and brass is in miniature and subminiature gyroscopes. They are used in guided missiles, radar-controlled firing mechanisms for guns, and a new automatic landing system used by carrier planes in soupy weather."

Copper's big future, though, say industry people, lies in the expansion of major markets: Electrical, building, and autos.

Says Charles Earle, American Smelting & Refining Co., New York: "Electrical expansion is the biggest single factor in copper's future." Electrical applications take about 50 per cent of all copper products. Uses should grow in automation, automatic control devices, and greater over-all use of electricity. Example: Remington Rand Corp.'s Univac II uses more than 16,000 lb of the red metal and its alloys.

Building construction takes about 14 per cent of today's output. Typical uses are home wiring, plumbing, downspouts, and lighting fixtures. Aluminum is expected to cut into some of those applications, but producers hope to pick up in other areas like roofing.

Automobiles account for 8 to 10 per cent of copper consumption. Usage per car has slipped some in recent years, but the tonnage is still substantial. Certain models of the 1958 Edsel take 59 lb of copper and brass.

Brass—The slump in copper sales is pointed up by the brass mill situation. Domestic shipments totaled 1,140,000 tons in 1955; they slipped to 1 million tons in 1956 and to 900,000 tons in 1957. CABRA says the chief reasons for the decline are: 1. Limited buying by automotive and appliance people. 2. A continued lag in housing starts. 3. The growing volume of imports.

To combat the slump, American Brass has set up intensive training and refresher courses for its sales people. The firm is also expanding branch offices and adding warehouses. Scovill Mfg. Co., Waterbury, Conn., is expanding its sales force and continuing to diversify operations. Example: Acquisition of Lydon Aircraft Inc. in 1957.

In 1958, look for brass mill business to hold at about 1957 levels. Sales forecasts by major mills range from 5 per cent higher to 5 to 7 per cent lower than last year's.

Brass mill imports are at a rate of more than 50,000 tons yearly. In terms of lost earnings to domestic mill workers, this equals fifty 40-hour weeks for 1500 men, says CABRA. The situation is being studied by the industry to see if any action should be taken.

Tariff—A tax on imports is likely—a 1.7 cent a pound tariff on copper goes into effect on June 30 unless Congress extends suspension of the import-excise taxes. If the price of copper is under 24 cents a pound on that date, the tax will be 2 cents a pound.

1958—Hand-to-mouth buying will continue as long as business stays down, believe metalmen. But some

Copper Looks to Power—R. G. Page

• "I'm pretty bullish about copper's long range potential," says Robert G. Page, president, Phelps Dodge Corp., New York. The 56-year-old head of the second largest domestic producer disagrees with pessimists who predict copper's death as a major metal.

Growth—He emphasizes: "Copper's principal market is (and will continue to be) in the generation, transmission, and use of power. As our population expands and living standards continue to rise, the electrical industry will grow accordingly. Copper will keep pace.

"Copper's properties and uses are pretty well known to consumers. The industry's job now is to improve products and promote increased use where it has demonstrated its superiority."

Switch—Promotion-mindedness is a shift for Phelps Dodge, traditionally the most conservative of the ultraconservative copper companies. Says Mr. Page: "In the past, there has been no stimulus for copper to search out new uses and markets. It was in tight supply from 1940 until June of 1956. During this period, no effort was made to find new uses because the industry could not supply its regular customers with as much as they needed.

"Now the situation is reversed. This has stimulated our search to improve wire and cable products, develop specialty wires, improve condenser and tube alloys, and to get into new fields such as copper drainage tubing."

Cuts—Mr. Page believes production cutbacks, rather than product promotion, are the answer to the immediate problem of oversupply. "World mine production exceeded consumption by about 194,000 tons in 1956, 85,000 tons in 1957," he says. "Some of the recent curtailments will be felt this year. If a few of the foreign producers would use a little restraint, production and consumption could be brought more into balance."

1958—Mr. Page sees domestic refined production (including scrap) this year at 1,120,000 to 1,170,000 tons, and overseas production at 1,825,000 tons. He estimates 1958 domestic consumption (including stockpile) at 1,400,000 to 1,435,000 tons, overseas consumption at around 1,575,000 tons.

During 1958, Mr. Page also looks for: 1. Further customer inventory cutbacks. 2. Labor peace in the industry. 3. More production curtailments.

signs point to a slight upturn in 1958: 1. The anticipated increase in military spending. 2. The predicted 6-per-cent upturn in residential building, plus modernization. 3. The forecasts of higher volumes in electronics and electrical appliances.

Consensus: There will be a better supply-demand balance in the U. S. as some cutbacks begin to be felt. Consumers will continue reducing inventories through the first quarter but should buy more metal as stocks are worked down.

Foreign production in 1958 will hold close to 1957 levels unless more curtailments are made. Consumption is seen at a little better than last year's figure.

Look for labor peace throughout the year. Major producers are protected by a three-year contract that runs to mid-1959. Many brass mill contracts also extend into 1959. Companies that will have labor talks this summer see little indication of a strike.

During the first three quarters, prices should be relatively stable. Look for the primary price to be around 30 cents a pound by year-end.

Future — A copper shortage is unlikely. Reserves are adequate to take care of world demand for at least 50 years (see table on Page 36). It's also estimated the government has 1 million tons in stockpile that could be released.

Free World production capacity is expected to climb to 3,944,000 tons by 1962. Charles H. Winship Jr., general sales manager, Phelps Dodge Corp., predicts Free World consumption in 1960 at 3.6 million to 4 million tons. He estimates that the primary copper price will be 30 to 35 cents a pound during the 1959-61 period.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Wolverine Spends To Save

Its $4-million investment in a tube extruder, cold reduction tube mill, and a series of bull blocks turned its Detroit plant into a profitmaker. Capacity increased 50 per cent

RENOVATING its old Detroit plant by spending $4 million on modern equipment and facilities saved Wolverine Tube Div., Calumet & Hecla Inc., $11 million it might have spent on top of that for a new plant.

The copper tube producer was faced with the choice of building a $15 million plant near Detroit, moving all operations to its Decatur, Ala., plant, or updating present facilities. Some change was necessary because the old straight line method of making tubing was running the Detroit plant into the red.

Old Way—With its obsolete equipment, Wolverine Tube was heating copper billets and forming them on a piercing machine into 8-ft rough finish tubes. Finished tubing was produced by putting these rough blanks through a series of draw bench dies.

As diameter grew smaller, tubes stretched out almost the length of the shop. Space was wasted since the draw benches had to be lined up to accomodate the long tubes. Handling was awkward, labor costs high, and output slow.

Starts Search—Spurred by customers who wanted even longer tubing, the company started scouring the U. S. and Europe for equipment that would fit into a plant only 600 ft long.

It came up with a tube extruder, a cold reduction tube mill, and a series of bull blocks that have been the key in switching the firm's Detroit operation to profitable circular tube drawing.

How New Equipment Works—While the bull block coilers make circular drawing possible, it would be almost impossible to utilize them in Wolverine Tube's Detroit plant without the tube reducer. It's built by Aetna-Standard Engineering Co., Pittsburgh.

Copper tubing (3 in. outside diameter) comes from the extrusion press in 24 ft lengths. Three of these tubes are fed past pinch rolls, over mandrels and through rolling dies which reduce them to 1.5 in. outside diameter in a single pass.

The rolling dies are housed in a saddle assembly which is driven by a crank and connecting rod system. As the crank rotates, the saddle moves forward and back causing the dies to rock along the tubes. This action reduces the outside diameter and rolls the inside diameter onto a tapered mandrel. Each time the saddle moves forward, the tubes are turned and fed forward. The dies are open on the reverse stroke allowing the tubes to rotate.

Fast Output—Some 4 in. of tubing are finished at each saddle stroke of 31 in. With three tubes going through, this means a foot of finished tube per stroke. Maximum production rate is 100 strokes per minute (100 ft of tubing). The drive motor is a 600 volt, direct current, job rated at 600 hp at 900 rpm.

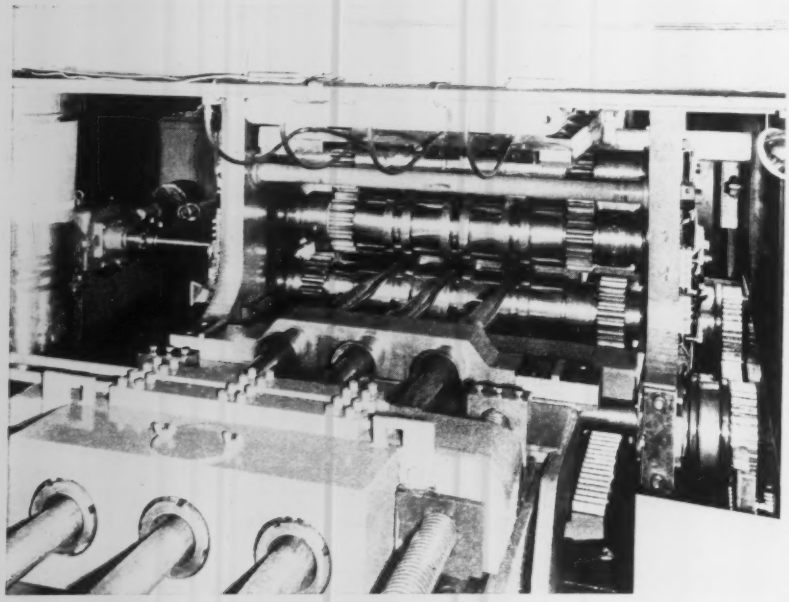
After cold reduction, the tubing (now about 220 ft long) moves into a breakdown bull block, through a process annealer and goes by overhead conveyor to one of four finish bull blocks which coil and recoil it through dies until it's the proper size.

Each bull block has its own integral handling system. Finished coils of tubing are stored in a surge conveyor to await shipment.

Pays Off—For Wolverine Tube the results have meant a 50 per cent increase in capacity. At the same time, production space has been cut from 282,000 to 242,000 sq ft.

Process time used to be four to six days. Now it's 6 or 7 hours. Uncontrollable scrap has been cut 25 per cent; rejected and damage scrap, 30 per cent. In-process inventory has been lopped in half.

Most important: The company has scheduled no layoffs, but plans on normal attrition (retirements, deaths, and quits) to reduce its working force 28 per cent from an original 900 employees.



This Aetna-Standard mill can cold roll 100 ft of copper tubing per minute

U.S. Space Flight by '63?

It's possible within five years, says Avco research expert, but he asks: "Is America willing to pay for it?" Except for re-entry, we have nearly solved all the problems

NO GREAT new scientific discoveries are needed to achieve manned space flight, claims Dr. Arthur Kantrowitz, director, Avco Research Laboratory, and vice president, Avco Mfg. Corp., New York.

Dr. Kantrowitz is a pioneer in magnetohydrodynamics, a system that could be used to propel space vehicles. It's described as: "The harnessing of energy under conditions of extremely high temperatures, ranging to a million degrees . . . extremely high exhaust velocities are produced with a relatively small amount of ejected mass."

Nose Cone Progress—Avco's Research & Advanced Development Div. says it has found the right shape for the Titan ICBM's nose cone. The firm has a $111-million contract with the Air Force for nose cone development.

We haven't solved the re-entry of ICBMs from altitudes an armed missile must fly, but Dr. Kantrowitz indicates we are close. An IRBM has survived the hot descent, but an ICBM involves different conditions, requiring different designs and materials.

The composition of the nose cone material (a cermet) is classified.

Russian Prospects—Dr. Kantrowitz thinks Russia will put up a manned satellite in three years. He suggests we can do it in less than five. But he asks: "Is America willing to pay for it?"

Avco reports it has made the results of its nose cone research available to companies doing similar work. Sixteen other firms are prime contractors on AF missile programs. General Electric Co. has a $158-million contract for the nose cones of the Atlas ICBM and Thor IRBM. (Because two firms are doing what might be considered duplicating work on ICBM nose cones, most observers assume the two missiles are different in design. Production of the Atlas is scheduled, while the Titan's future seems to depend upon test firings in 1958-59.)

Basic Science—Some 1700 scientists, engineers, and technicians are working at Avco's Lawrence, Mass., research center. Avco reports Dr. Kantrowitz's work has produced "the only information in the Free World on speeds above Mach 12."

Victor Emanuel, Avco's chairman, says the research center is a profitable operation. New $15-million quarters will be ready this summer at Wilmington, Mass.

Here are some of the areas being explored to put man in space and bring him back: 1. Use of magnetic forces to provide lift and drag for space vehicles. 2. Reactions of metals to heats more intense than those at the surface of the sun (10,000° F). 3. Synthesization of transistor elements.

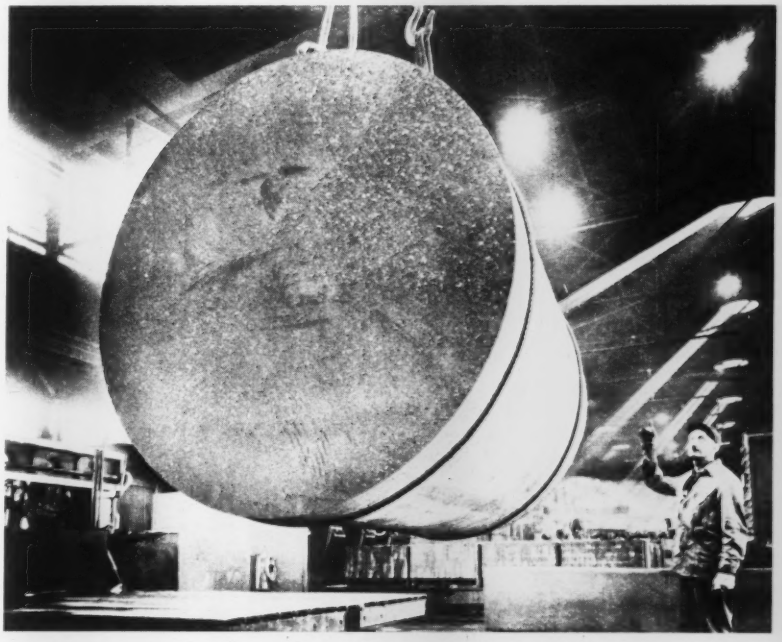
Other activities include: Propulsion, radar, guidance, gas dynamics, nuclear energy, metallurgy, navigation, communications, fire control, and electronic computers.

Space Flight?—Dr. Kantrowitz thinks we are on the verge of interplanetary travel because we are already committed to building reliable rocket engines and superaccurate guidance systems for our ICBM programs.

Among the problems of space travel he names: 1. Man's physiology. 2. His food and oxygen supply. 3. Collisions with meteors. 4. Deceleration for landing.

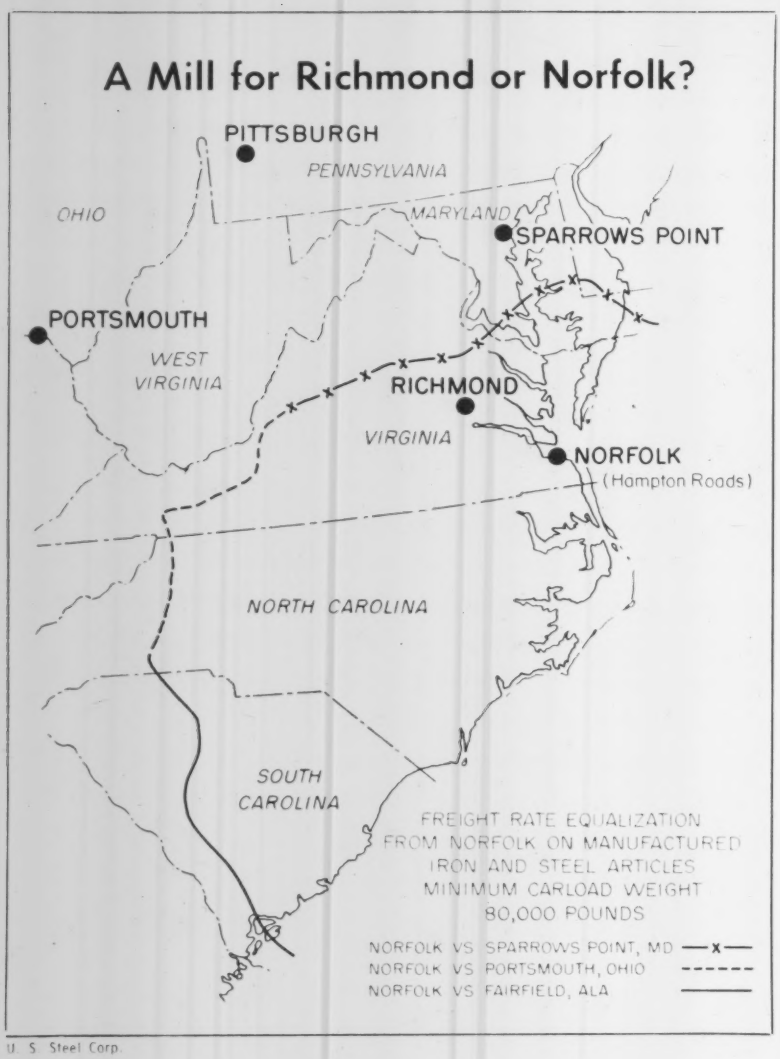
Science has almost solved the first three problems, at least for short space trips, reports Dr. Kantrowitz. Deceleration is his special province: "It has become clear that only a small fraction of the heat which is generated upon re-entry will actually flow into the object. It is also clear this fraction can be radiated away during the deceleration period—if the frontal area of the satellite is sufficiently large for its weight."

Dr. Kantrowitz says it is possible to calculate maximum surface temperatures reached by a hollow sphere of stainless steel during re-entry.



Over 5 Ft in Diameter, Carbon Electrode Weighs 10 Tons

It was developed by National Carbon Co., a division of Union Carbide Corp., anticipating needs for larger conductors. Electric furnaces being designed will use as much as 50,000 kilovolt-amperes in producing phosphorus, calcium carbide, and ferroalloys for the chemical and steel industries



U. S. Steel Corp.

Virginia Bids for Steelmaker

VIRGINIA deserves consideration as a site for additional steelmaking facilities, says Dr. Charles L. Quittmeyer, associate professor of business at the University of Virginia, Charlottesville, Va.

He backs up that view with these four points: 1. The tri-state region of Virginia, North Carolina, and South Carolina provides a sound market for a new 50,000-ton (annual capacity) electric steel plant. 2. Richmond or Hampton Roads, Va., would be likely sites. (Virginia's present steelmaking capacity, including the output of an electric furnace at Roanoke, is 40,000 tons.) 3. Products might include merchant and reinforcement bars and bar shapes, small angles, joints, and narrow strips and plates for further fabrication. 4. The market is too small to allow development of integrated open hearth facilities.

His observations are contained in a report prepared for the Advisory Council on the Virginia Economy.

Growing Market — Dr. Quittmeyer points out that the steel-using industries of Virginia, North Carolina, and South Carolina are growing rapidly. In Virginia alone, the output of fabricated metals grew from $23 million in 1939 to $92 million in 1954—an increase of 300 per cent, not allowing for inflation. During 1947-56, the state's employment in metal fabrication increased by more than 50 per cent, from 5800 to 9300. Its employment in manufacturing of machinery and electrical equipment quadrupled, from 2000 to 8000.

The three states consumed about 1 million tons of steel in 1955, says Dr. Quittmeyer. His estimate of tonnages consumed by product classification: 360,000, structural shapes; 250,000, plates; 165,000, bars and shapes; 130,000, sheets and strip; 45,000, wire; 50,000, miscellaneous carbon products; 3000, alloy bars and shapes; 1000, miscellaneous alloy products; 1000, stainless.

Present Suppliers—Receipts of steel products by South Atlantic states via coastal ports are negligible, says Dr. Quittmeyer. Almost all deliveries to the tri-state market are made by rail. The most substantial penetration is from Pittsburgh. Sparrows Point, Md., is a secondary supplier. The Cleveland-Youngstown district competes noticeably in the northern part of the market. Birmingham is most important as a supplier to the southern sector.

Delineating his market on the basis of freight rate equalization, Dr. Quittmeyer asserts that a Richmond or Hampton Roads producer could expect an annual demand of about 1 million tons. With access to ocean transport, it might ship a tenth of its output to coastal Georgia and Florida, but it couldn't count on a significant share of the export market. Reasons: 1. "The hold on the foreign market by the present producers and those who will use the St. Lawrence Seaway would be difficult to break." 2. "Foreign countries are looking forward to more self-sufficiency."

Weaknesses — Dr. Quittmeyer's enthusiasm for the tri-state market is tempered by his admission that it is weak in concentration of important steel-consuming indus-

tries. It's deficient in the manufacture of automobiles, machinery, machine tools, and equipment for the oil, gas, and mining industries. But it's fairly strong in construction, maintenance, and shipbuilding.

Despite his estimate of the tri-state area's consumption, Dr. Quittmeyer thinks the market is too small to justify construction of open hearth facilities. "A Virginia producer would probably find it difficult to capture 30 per cent of the market and would, of course, find penetration into other areas difficult." Another drawback: An integrated mill of the size contemplated (1.5 million tons) wouldn't be big enough to make the most of modern production methods.

An abundance of top-grade coking coal and limestone within Virginia's borders favors establishment of an integrated mill. But such a plant would require supplementary iron ore, tremendous quantities of water, a 3000-acre site, and a labor force of 8000—all of which would be difficult to find.

Recommendation — The capturable market is large enough to support an additional small electric steel plant and bar mill, Dr. Quittmeyer asserts. He recommends an initial capacity of 50,000 tons, with allowance for near-future expansion to 100,000 tons.

Fearing no shortages of water, labor, or scrap for a plant of modest size, Dr. Quittmeyer declares that electricity is cheap and plentiful, other utilities are sufficient, and transportation is excellent. "Probably the only real question marks concern the price of scrap in the tidewater area (if foreign buyers bid it up) and the need for top level managerial assistance."

Adds Space for Missiles

Bell Aircraft Corp. will spend $2.5 million to expand its Buffalo plant. President Leston P. Faneuf said the expansion will give Bell "one of the most completely integrated facilities in the nation for missile and airplane development and for electronic and rocket work." The program calls for a 220,000 sq-ft addition, bringing the total floor area is 1.5 million sq ft.

U. S. '57 Production of Some Major Plastics

Material	Millions of lb	% Change Vs. '56
Polyesters	94.8	+30.7
Cellulosics	151.0	+ 3.5
Polystyrene	635.4	+ 1.1
Polyethylene	682.8	+22.6
Vinyls	841.2	+11.8
Urea and Melamines	308.5	– 2.8
Phenolics and other Tar Acid Resins	475.9	– 7.1

Source: Society of Plastics Industry Inc.

'58 Plastics Output To Rise

PRODUCERS of plastics and resins expect to set their seventh consecutive yearly production record in 1958, but the gain will be only 1 to 2 per cent.

That's the forecast of the Society of the Plastics Industry Inc., New York. It reports that 1957 production of 4.3 billion lb was 7 per cent above the '56 total.

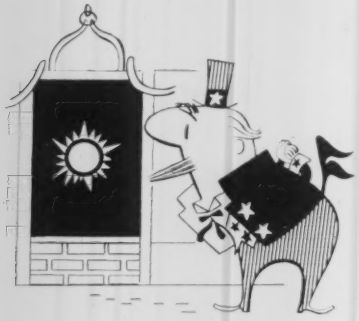
Big Business—Dollar value of 1957 output was placed at $2.1 billion, vs. $2 billion in 1956. Sales of new molds continued to grow in '57, but the increase was only 2.5 per cent above the 1956 mark—the gain then was 16 per cent over the 1955 performance.

During 1957 high density polyethylene, an olefin plastic, became easier to obtain. Polypropylene, another olefin plastic, which was available in Europe in 1957, hit the U. S. market in December when one American firm started to make it.

New Orleans Times-Picayune

New Orleans Cantilever Bridge Has 1575-Ft Main Span

Scheduled for spring completion, it will be the longest of cantilever design in the U. S. Bethlehem Steel Co., fabricator and erector, used 16,444 tons of steel for the main portion. The center section consists of a 689-ft suspended span, hinged to 443-ft cantilever arms on either side



BDSA Predicts '58 Steel Production

The Business & Defense Services Administration's Iron & Steel Division predicts steel ingot production this year will be 108 million to 110 million tons, vs. about 113 million tons in 1957.

The decline will come from continued reduction of users' inventories because consumption is expected to equal 1957's rate. The Iron & Steel Division reports inventories were cut by 1.5 million tons in the last quarter of 1957. It expects the trend to continue "into early 1958."

Steel output will be depressed during the first half, but a better half will follow with "a recovery of business activity, coupled with the necessity to replenish inventories." This forecast is based on expected metal consumption in 1958 by the other industry divisions of BDSA.

Steel Defense Needs Stay Steady

By Jan. 1, 1959, U. S. steel capacity will rise to 146.5 million tons, compared with 141.1 million tons today. We won't use that much before 1965, guesses one division executive.

Demand for steel will not be too heavily influenced by defense needs, unless we build the millions of radioactive fallout shelters sought by some Capitol Hill leaders. Even if such a program began this year, it would affect steel consumption little.

Defense steel shipments run from 2 to 4 per cent of total sales. Shifts to missiles will affect specific grades and shapes but not the total amount of steel used this year, says the BDSA Division.

Some Steel Markets Will Grow

BDSA sees construction spending up 1.5 per cent in 1958, with gains in residential building and highway and utility construction. Other industries that will pick up, says BDSA, include: Civilian shipbuilding, electrical machinery, oil and gas equipment, containers, and agricultural machinery (by a healthy 10 per cent because of the expected rise in farm income).

A big drop will come in freight car production: Down to 60,000 from 100,000 in 1957. Civilian aircraft and autos will also be off, indicating a generally depressed year for steel in transportation, except for truck production.

Appliances will maintain their 1957 level, but machinery (other than electrical) will be spotty. Mining and construction machinery makers are the most optimistic, while BDSA sees machine tools off 25 per cent or more. Both exports and imports of steel will be down this year.

Is the Jupiter Program Safe?

Rumors that Defense Secretary Neil McElroy will scrap the Army's Jupiter program are still making the rounds in Washington, even though the Army has officially awarded Chrysler Corp. a $30-million contract. (Another $22-million contract was made with Chrysler on Dec. 31, 1957, for Redstone production.) The Army reports all tooling is being completed to produce the 1500-mile Jupiter. The $30 million will go for some completed missiles this year, plus long leadtime items and ground support equipment.

You can't build too many $500,000 to $750,000 missiles for $30 million. Meanwhile, the Air Force says it has plans "to catch the Russians in the field of IRBMs by 1960." Its missile, the Thor, is reportedly ready to be produced by Douglas Aircraft Co. Inc. "in quantity" (probably about six per month).

As more dollars go for research and development of better IRBMs than the Thor and Jupiter, look for some Congressional pressure to drop the Jupiter. That might save $200 million in the fiscal 1959 budget.

Missile Industry Breakdown

Association of Missile & Rocket Industries, Washington, has cataloged 960 companies in the U. S. directly involved in missile work. Many more are implicated indirectly.

The five most important missile states are: California, 208 plants; New York, 167; Pennsylvania, 68; Ohio, 67; New Jersey, 66.

AMRI has surveyed the industry for opinions on the need for a shakeup in the Pentagon. More centralization is demanded by all respondents, says AMRI, while they are divided on the question of removing the missile program to a separate civilian agency.

Rivers & Harbors Battle Looms

Bureau of the Budget clamped down last month on Corps of Engineers' spending during the rest of fiscal 1958. The reason, says Rep. Overton Brooks (D., La.), is to carry over funds into fiscal 1959. Then a 20 per cent cut in rivers and harbors spending next fiscal year would be more palatable to Congress.

Representative Brooks has been leading the fight to win passage of a $1.5-billion program, described as a long range attack on our river development needs. Advocates cite the tremendous gains of Russia and China in these areas.

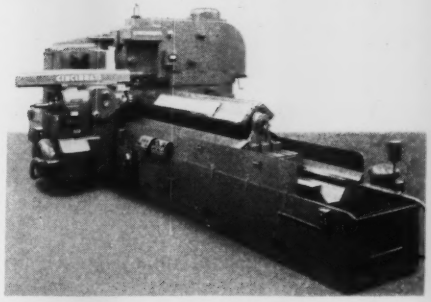
HyPowermatic

with Two 50 hp Spindles

Mills Several Surfaces of Long Steel Parts

Above: Straddle milling operations, too! The setup illustrated above shows how it's done.

Below: CINCINNATI Special 100 hp HyPowermatic Milling Machine removes metal in a torrent or a light flurry, as required by the part being milled.



Unusual requirements are commonplace conditions for Cincinnati's Special Machine Tool Division. A manufacturer of a variety of long steel knives, blades and similar parts wanted a machine having the versatility to mill the entire range of these parts, and in addition, rapid rates of metal removal were required. Cincinnati Engineering Service Specialists, using the extensive standard HyPowermatic line as a basis, developed the special HyPowermatic Milling Machine illustrated here. Excellence of performance may be judged from the following specification highlights:

50 hp motor drive for each spindle . . . table feeds 1/4 to 100 ipm . . . spindle speeds 20 to 800 rpm . . . rapid table traverse 200 ipm . . . 168" table travel . . . automatic quill retraction . . . high pressure flushing system for continuous removal of chips

For all milling operations, the work is held on a universal magnetic chuck, energized prior to the table traverse, and equipped with power angular positioning. This machine is typical of single units of production equipment built by the Special Machine Tool Division. Other types of equipment range up to complete production lines. May we show you what we can do to solve your metal-working production problems and their related handling chores? Our Engineering Service team wants to hear from you.

Special Machine Tool Division

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

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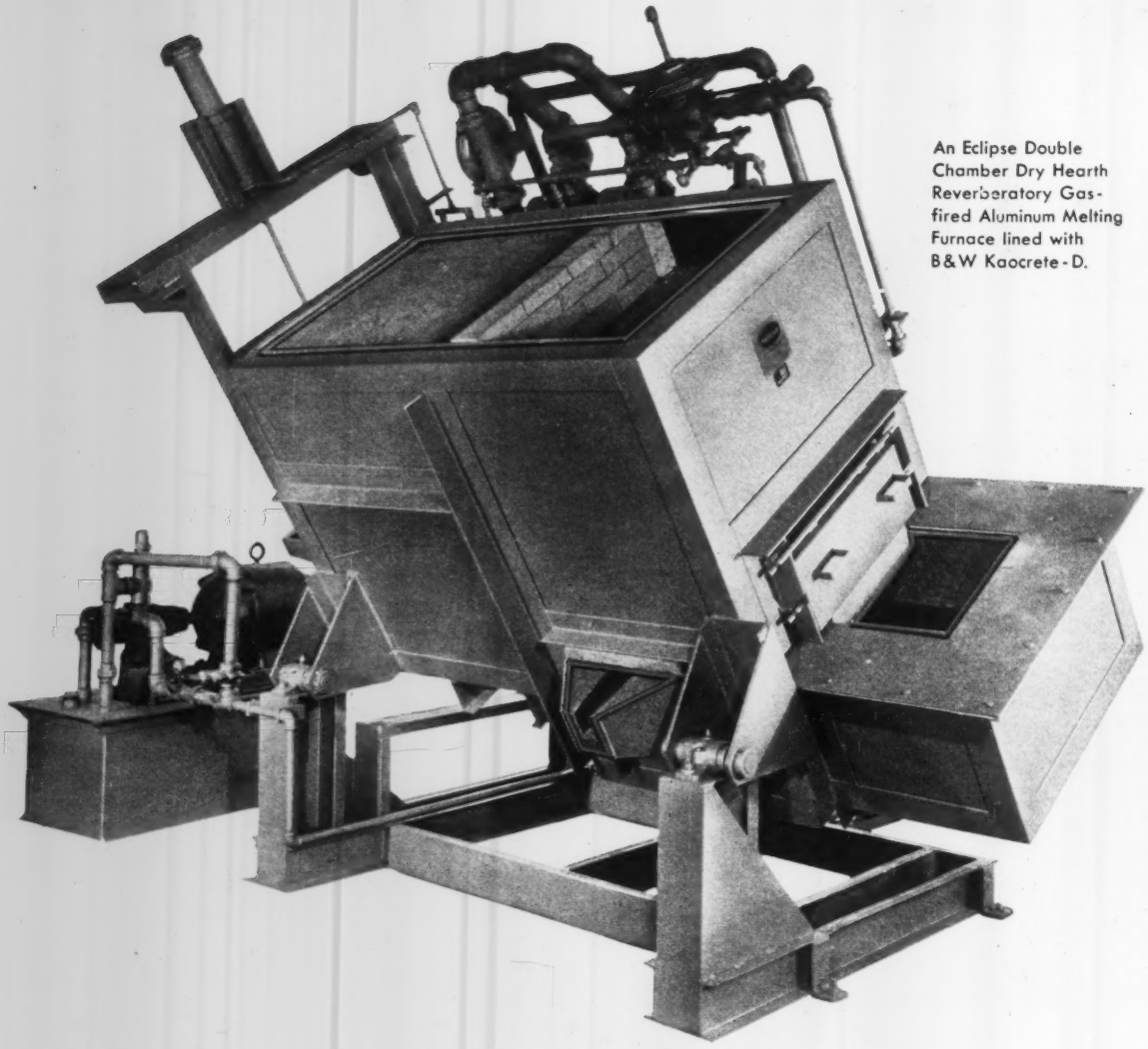
SPECIAL MACHINE TOOLS AND COMPLETE PRODUCTION LINES



An Eclipse Double Chamber Dry Hearth Reverberatory Gas-fired Aluminum Melting Furnace lined with B&W Kaocrete-D.

Eclipse builds aluminum reverbs lined with B&W refractories

B&W Kaocrete-D provides a rugged refractory lining in this gas-fired aluminum melting furnace built by Eclipse Fuel Engineering Company of Rockford, Illinois. Equipped with an hydraulic tilting mechanism for pouring large sand castings or transferring molten metal to a holding furnace or large ladle, the furnace has separate melting and holding chambers lined with B&W Kaocrete-D.

Eclipse installs this B&W Refractory Castable in their aluminum reverbs because it provides three important benefits:

(1) The melting chamber is easy to clean since metal does not build up on or adhere to the face of B&W Kaocrete-D. That's because this refractory castable is non-wetting. Metal penetration of the contact face is kept at a minimum because of the low permeability of the castable. The refractory walls of the furnace do not require excessive scraping.

(2) B&W Kaocrete-D has unusually high strength. Combined with high density, this enables Kaocrete-D to withstand the abrasion of cleaning tools and the considerable physical abuse of charging.

(3) Kaocrete-D is easy to install. The refractory castable is simply poured and rodded in the furnace shell.

This is only one of the many applications of B&W Refractory Castables in a wide range of industrial furnaces. Why not investigate the advantages of these *specialized* refractories in your furnace designs?

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BABCOCK & WILCOX

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REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST. NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R-591

Caterpillar Tractor Co.

What Clerical Workers Are Paid

(National average)

Job Classification	Current Avg Weekly Wage	Increases in Last 12 Mo
Addressing machine operator	$56	$0
Bookkeeper (junior)	71	3
Bookkeeper (senior)	87	2
Bookkeeping machine operator	57	2
Calculating machine operator	63	1
Cost clerk	78	4
Duplicating machine operator	61	3
File clerk	53	1
General clerk (junior)	56	3
General clerk (senior)	67	3
Key punch operator	62	2
Mail clerk	55	3
Messenger	51	3
Payroll clerk	71	3
Private secretary	83	2
Sales order clerk	74	3
Stenographer (junior)	60	1
Stenographer (senior)	67	1
Stenographic secretary	73	1
Tabulating machine operator	75	4
Telephone operator	61	1
Transcribing machine operator	59	3
Typist (junior)	54	1
Typist (senior)	60	1

Whitecollar Wages Rise

NOMA survey finds that pay envelopes of U. S. office workers are fatter than ever. Average wage is $2 higher than it was a year ago, but rates still vary widely

CLERICAL employees in the U. S. now get an average wage of $64 weekly—up $2 from the 1956 average. That's the finding of a survey by the National Office Management Association covering 6058 companies representing 464,905 employees.

Highest paid are senior bookkeepers who average $87 weekly. In Houston, they get the top U. S. rate—$109 weekly. Messengers are lowest paid, averaging $51 weekly. File clerks are next to the bottom at $53.

Rates vary sectionally.

Western States — They pay $5 more than the national average. Calculating, tabulating, and transcribing machine operators do the best—$7 to $9 above the national average.

East Central States—They offer the highest average pay to cost clerks ($84) and to sales order clerks ($82). Area scales are equal to or above the national average on all jobs except senior bookkeepers ($1 less).

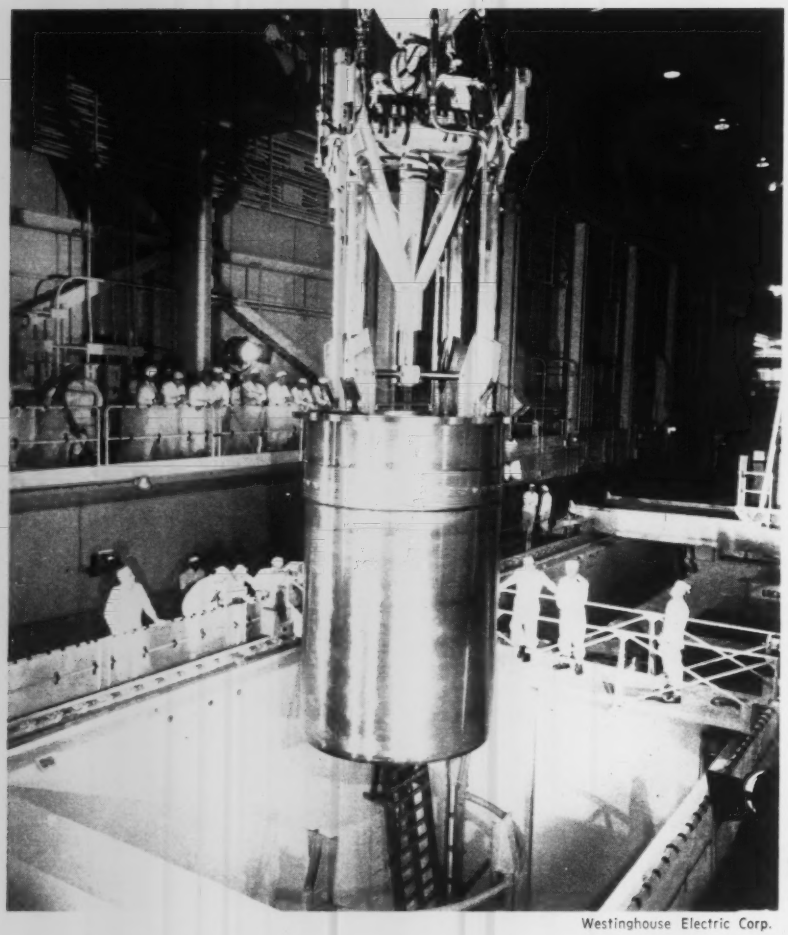
West Central States—Seven categories—general clerks; bookkeeping; tabulating, addressing, and calculating machine operators; and file and sales order clerks—get salaries equal to or above the U. S. average.

Southern States — Only five groups—senior and junior bookkeepers and general, payroll, and cost clerks—are paid equal to the national average.

Eastern States — Transcribing machine operators, telephone operators, and sales order clerks are the only groups in this area whose pay equals national averages.

Job Breakdown—Rates vary with cities. Here are some highs:

- Cost clerks get $107 in Tulsa, Okla.
- Private secretaries get $105 in Beaumont, Tex.
- Junior bookkeepers get $97 in Huntington, W. Va.
- Calculating machine operators get $97 in Monterey Bay, Calif.
- Sales order clerks get $95 in Port Huron, Mich.
- Transcribing machine operators get $85 in Charleston, W. Va., area.
- Senior stenographers get $83 in San Jose, Calif., and Detroit.
- Senior typists get $76 in Detroit.



Westinghouse Electric Corp.

Lowering the core of the power reactor at Shippingport, Pa., the world's largest

Russia Lags in Atom Race

ALTHOUGH RUSSIA holds a lead in the "race for space," she lags far behind the U. S. in the peaceful application of atomic power.

We hold an edge even though nuclear power is more economically feasible for the USSR. Atomic power cannot compete, costwise, with conventional fuel in the U. S. at present. Plant designs will have to be substantially upgraded before it will.

Russia's major industrial centers are in the western part of the country, but about 70 per cent of her fuel reserves lie in the eastern Asiatic regions. So Russian investment in nuclear power, though extremely costly, would probably be immediately justifiable.

We're Ahead of Reds—Russia is operating only one power-producing plant, a 5000-kw reactor at Obninsk. The U. S. has about 90,000 kw of operating capacity. This includes the newly opened Shippingport, Pa., plant. It has 68,000 kw of capacity, the largest of any single reactor in operation.

British Lead — Great Britain, faced with an immediate need for nuclear power, is far ahead of everyone. Although she has only 84,000 kw of operating capacity (the two gas cooled reactors at Calder Hall), she has 1,662,000 kw of capacity under construction. The nation has a solid program to build 5 million kilowatts by 1965.

Falling Back—Russia's deputy atomic energy chief, N. A. Nikolayev, described plans to build six stations with about 1 million kilowatts of capacity. This is in contrast with a Kremlin statement two years ago that Russia would build 2.5 million kw of capacity within five years. Observers wonder what happened to the other 1.5 million.

Most of Russia's planned capacity would come from two, 400,000-kw plants, one of which, scheduled for 1960 completion, would be a pressurized water type, the same as our Shippingport station.

The Soviet Union's plant designs are technically comparable to ours. Examples: Russia is planning a 50,000-kw fast breeder. The U. S. will have a 100,000-kw fast breeder in operation at Monroe, Mich., in 1960. We operated a 200-kw breeder at Arco, Idaho, in 1951.

Russia's Nikolayev also announced plans for a 70,000-kw boiling water station. The U. S. has two 5000-kw reactors of this type in operation—one at Vallecitos, Calif., built by General Electric Co., and one at Lemont, Ill., built by Argonne National Laboratory. Four U. S. firms have five such reactors under construction. Their combined capacity: About 270,000 kw.

Gathering Speed—In addition to the power reactors listed in the table at right, the U. S. completed nine research and test reactors during 1957. Under construction are 24 more. Also being built are 29 reactors or reactor prototypes for naval vessel propulsion. They are in addition to 28 small reactors for research, training, and exhibit which U. S. industry completed or was building in 1957.

General Electric Co. and Pratt & Whitney Aircraft are developing reactors for aircraft propulsion, under AEC contract.

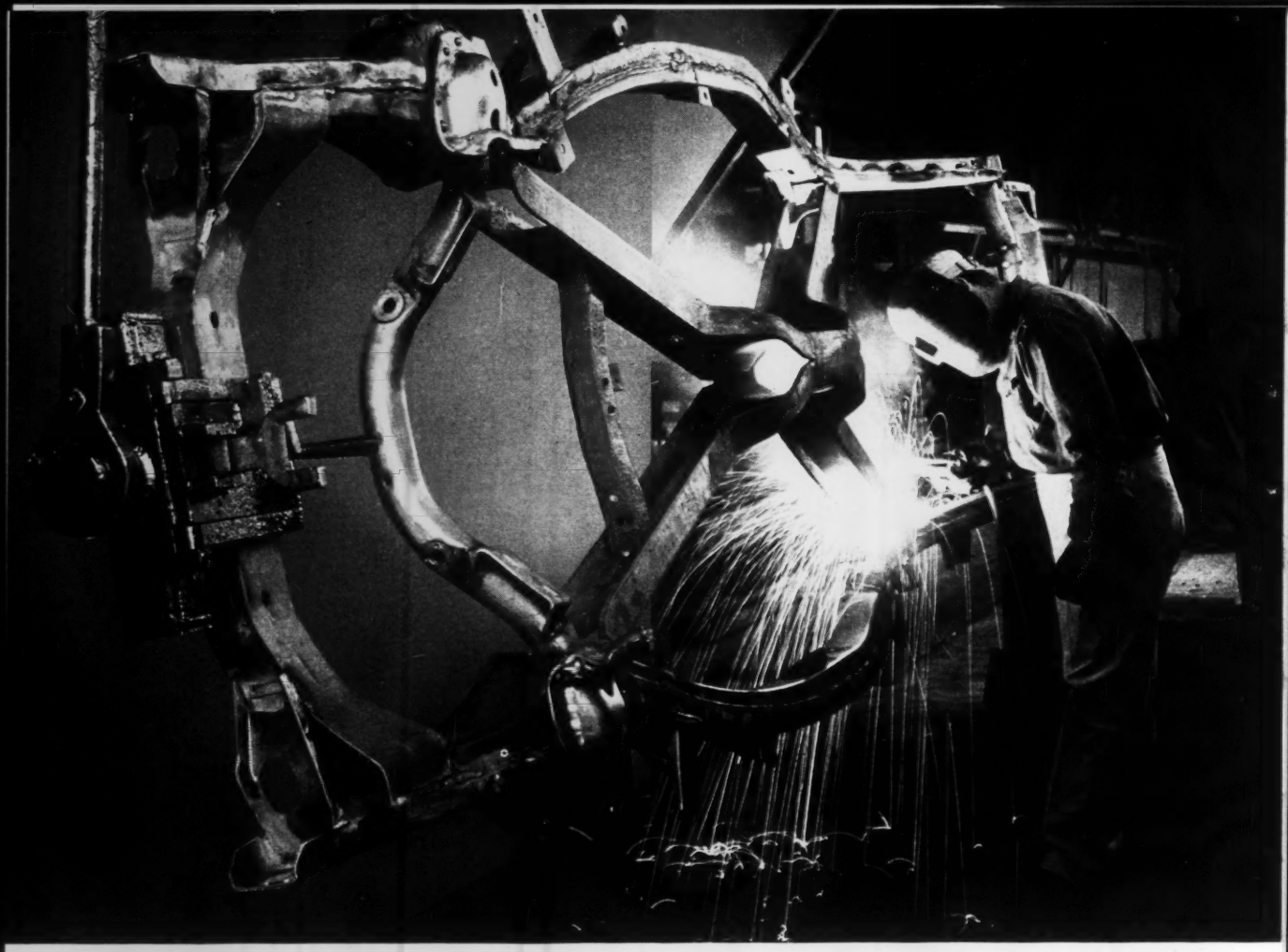
Uranium Supply—During 1957, seven companies contracted with the AEC to build uranium mills. Six more are under construction and 11 are already operating. The 24 facilities will have a daily capacity of 20,420 tons of ore. They represent a $132-million investment, reports the Atomic Industrial Forum Inc.

Scoreboard for Power Type Nuclear Reactors

BUILDER	TYPE	LOCATION	GROSS CAPACITY (000 kw)	STATUS
Aerojet-General Corp.	Gas cooled (experimental)	Arco, Idaho	n.a.	Under development for AEC
Alco Products Inc.	Pressurized water package	Ft. Belvoir, Va.	2	Completed for AEC & Army
Alco Products Inc. and Sanderson & Porter	Gas cooled pellet bed	n.a.	n.a.	Under study
Allis-Chalmers Mfg. Co.	Boiling water	Sioux Falls, S. Dak.	66	Completion date: 1962
American Machine & Foundry Co.	Boiling water	Elk River, Minn.	22	Canceled
American Machine & Foundry Co.	Boiling water	West Germany	15	Negotiating for sale
American Nuclear Power Associates	Liquid metal fuel	n.a.	n.a.	Under development by Raytheon Mfg. Co.
Argonne National Lab.	Boiling water (experimental)	Lemont, Ill.	5	Completed
Argonne National Lab.	Breeder (experimental)	Arco, Idaho	0.2	Rebuilt (operated in '51)
Argonne National Lab.	Breeder (experimental)	Arco, Idaho	20	Completion date: 1959
Argonne National Lab	Boiling water package	Arco, Idaho	0.2	Completion date: 1958
Babcock & Wilcox Co.	Pressurized water with superheater	Indian Point, N. Y.	275†	Completion date: 1960
Babcock & Wilcox Co	Liquid metal fuel (experimental)	Brookhaven National Laboratory	20 (heat)	Under development
Du Pont Co.	Heavy water	n.a.	n.a.	Received AEC assignment
Design by: General Nuclear Engineering Corp.	Natural uranium, gas cooled, heavy water	Central Florida	136	AEC refused assistance contract[1]
Ford Instrument Co.	Gas cooled	Holyoke, Mass.	15	Canceled
Foster Wheeler Corp.	Aqueous homogeneous	Hersey, Mich.	10	Canceled
General Electric Co.	Boiling water	Vallecitos, Calif.	5	Completed, for own use
General Electric Co.	Boiling water	Dresden, Ill.	180	Completion date: 1960
General Electric Co.	Plutonium producing	n.a.	n.a.	Received AEC assignment
General Electric Co.	Plutonium recycle	Not definite	15	Under development
General Electric Co.	Two boiling water	n.a.	10-12	Negotiating for export[2]
Kaiser Engineers and ACF Industries Inc.	Natural uranium, gas cooled, graphite moderated (experimental)	n.a.	40	Received AEC assignment
Martin Co.	Pressurized water	Dominican Republic	13	Under negotiation[2]
North American Aviation Inc.	Sodium (experimental)	Santa Susana, Calif.	6.5	Completed
North American Aviation Inc.	Organic moderated (experimental)	Arco, Idaho	16 (heat)	Completed
North American Aviation Inc.	Sodium graphite	Hallam, Nebr.	75	Completion date: 1961
North American Aviation Inc.	Organic moderated	Piqua, Ohio	12.5	Completion date: 1960
North American Aviation Inc.	Organic moderated	n.a.	10-12	Export under negotiation[2]
North American Aviation Inc.	Sodium cooled thorium breeder	n.a.	n.a.	Negotiating contract
Not named	Water	Saxton, Pa.	Small	Construction by 1960?
Not named	n.a.	n.a.	200	Considering construction by 1964
Not named	Water	n.a.	Large	Under consideration
Nuclear Development Corp. of America	Sodium cooled, heavy water moderated	Anchorage, Alaska	10	Completion date: 1962
Oak Ridge Nat'l. Lab.	Homogeneous (experimental)	Oak Ridge, Tenn.	0.3	Completed
Power Reactor Development Co.	Fast breeder type	Monroe, Mich.	100	Completion date: 1960
Vitro Corp. of America	Pressurized water	Southern Italy	150	Received contract
Westinghouse Electric Corp.	Pressurized water	Shippingport, Pa.	68	Completed
Westinghouse Electric Corp.	Pressurized water	Rowe, Mass.	134	Completion date: 1960
Westinghouse Electric Corp.	Heavy water	Parr, S. C.	17	Completion date: 1962
Westinghouse Electric Corp.	Pressurized water	Milan, Italy	134	Letter of intent received
Westinghouse Electric Corp.	Pressurized water	Mol, Belgium	11.5	Under construction
Westinghouse Electric Corp.	Homogeneous	Eastern Pa.	70-150	Under development

Source: Atomic Industrial Forum.

Listing does not include reactors built for propulsion of aircraft and naval vessels or nonpower types for research, exhibit, or training. †163,000 kw from reactor and 112,000 kw from superheater. 1. Two groups have proposed a smaller gas cooled reactor in its place. 2. Plans are contingent on agreement between U. S. and countries involved (Brazil, Cuba, and Mexico).



At this point an automobile frame is near completion. The X-member is being welded.

FRAMES LIKE THIS DEMAND A STRONG STEEL

Automobile frames, like so many products, are only as strong as the steel that goes into them. Automotive manufacturers and other customers have long relied on Great Lakes steel for strength and dependability.

Great Lakes quality-controlled steel provides a safe margin of strength, assuring customers satisfaction in this respect.

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When you get Great Lakes steel you get steel that fits your specifications, delivered on time. For the full story of Great Lakes quality-controlled steel, make it a point to call your Great Lakes Steel representative soon. He's as near to you as your telephone.

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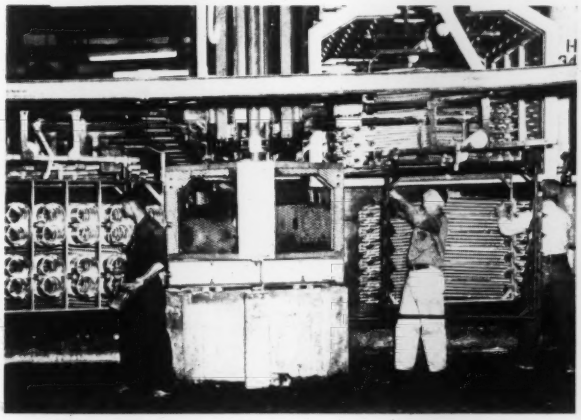
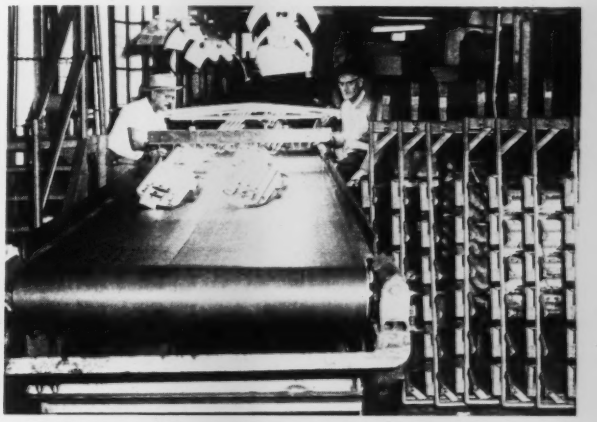


Grilles and bezels are racked at this merry-go-round station before entering the anodizing line (right rear)



Current passing through copper brushes lights up reject lamps if anodic penetration on these grilles isn't adequate

Chevrolet Anodizes Grilles

Its Flint, Mich., installation, one of eight in the auto industry, bright finishes aluminum grilles and headlight bezels. Two dye tanks in the line (not used now) may mean color for '59

CHEVROLET is bright finishing aluminum grilles and headlight bezels in its recently installed anodizing line at the division's press plant, Flint, Mich.

The installation is one of eight in the auto industry. Chevy started assembly of its equipment last July. Pilot runs were made in August. Full production started in mid-September.

Timing—The 165 ft. 32 station line processes 65 racks each hour on a 55-second cycle. The installation has 99 racks. Each one holds 84 bezels or 12 grilles.

Racks are made of aluminum and are insulated with a vinyl resin. Their titanium tips act as electrical contacts for directing current flow through the parts. Although Chevrolet isn't using color on '58 grilles and bezels, two dye tanks are in the line if changes call for color anodizing.

Penetration—Grilles and bezels are anodized to a minimum depth of 0.0002 in., but anodizing time can be varied. Liquids in the tanks are agitated by air, but the bright dip tank has an air and mechanized agitation system. It contains a solution of 95 per cent phosphoric acid and 5 per cent nitric acid.

Tank temperature is important. The anodizing tank is cooled through a system of heat exchangers to 68-70° F. Soak clean solutions are maintained at 160 to 180° F, hot seal tanks at 205 to 210° F. Deionized water for the hot seal tanks is supplied through a 4000-gallon-per-hour system. Chillers, heat exchangers, blowers, pumps, and storage tanks are installed in a basement under the anodizing line.

Rejects—Only about 1 per cent of the grilles and 4 per cent of the bezels are rejected, but a small reclamation room is near the line to de-anodize parts that can be repaired.

Most rejects are caused by blemishes formed during stamping. Since the aluminum parts seldom need any finishing operations after stamping, they're brought directly to the anodizing line. Sometimes, die nicks and marks which will keep parts from receiving a good anodic penetration are overlooked.

Inspection — Final inspection is simple. Anodized grilles are placed on a conveyor next to the line. They pass beneath a series of copper brushes so at least two brushes contact the grille.

If the anodic penetration is sufficient, the surface is dielectric, and no current can pass through. If not, contact is made, and lights flash to indicate a reject. A similar conveyor line checks bezels.

Buddies — Although aluminum and stainless steel have been hot competitors in the auto industry, Chevrolet's anodizing line is one area where both are used.

Soaking, dye, and hot rinse tanks are made from 304 stainless steel as is the push-pull, downdraft ventilator system installed over the line. One stainless fabricator estimated the ventilating system cost Chevrolet about $175,000.

A bright dip tank is made from 347 stainless which prevents processing solutions from causing cor-

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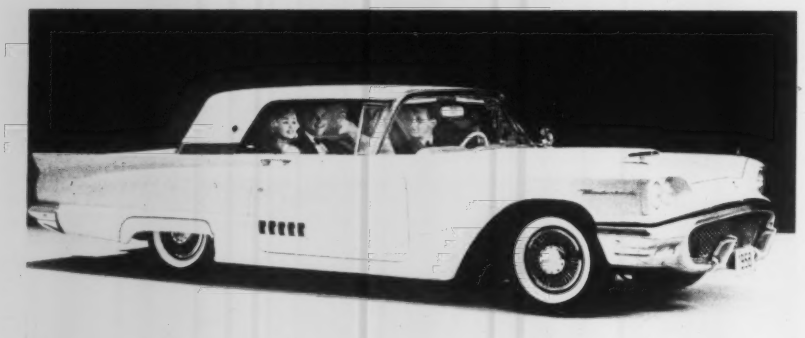

Ford's Luxury T-Bird Now Seats Four

Revamped Thunderbird is aimed at luxury market. It's 205.4 in. long, 52.5 in. high, and has 113-in. wheelbase. Discontinued two seater was 181.4 in. long, 51.5 in. high, and had 102-in. wheelbase. Front seats are separated by an instrument console. Engine is an OHV V-8; develops 300 hp at 4600 rpm, has 352 cu in. displacement, and 10.2:1 compression ratio

rosion. Other tanks use vinyl resin coated carbon steel.

Auto Forecasts Pessimistic

Pessimism is creeping into forecasts of 1958 car sales and production. Reason: Auto executives think car buyers lack confidence in the economy.

Harlow Curtice, president, General Motors Corp., says: "For various reasons, confidence at present seems to be somewhat shaken and an attitude of caution appears to prevail." He suggests domestic retail passenger car sales in 1958 will be somewhat lower than the 5.8 million sold in 1957.

The industry's current annual sales rate is about 5.5 million.

James O. Wright, Ford Div. general manager and company vice president, reports: "Too many pessimistic announcements are having a serious effect on the auto market." Mr. Wright still anticipates sales of around 6 million, as do most other auto company heads.

On the production front, *Ward's Automotive Reports* claims only 5.3 million passenger cars are scheduled for completion this year. That is a minimum forecast and includes 100,000 units built for export. It's 12.2 per cent lower than the 6.1 million cars turned out in 1957.

Ward's also predicts 300,000 imported cars will be sold in '58. This will be 100,000 more than '57 registrations and makes for a correspondingly smaller market for domestically produced cars.

One fact Detroit tends to forget is that it traditionally slumps harder and recovers quicker than areas which are diversified. Automakers will do well to remember what Mr. Curtice points out: Defense spending seems likely to pick up in the second half as more money is made available for missile buildups. This should bolster consumer confidence—and sales. Enough credit is available to handle the increase.

Undoubtedly, the first half will be slow as the buying public recovers its confidence and car builders move cautiously toward union negotiations in late spring.

Here's a breakdown of how sales can go if current trends continue through the year:

Domestic cars	5,600,000
Imported cars	300,000
Total	5,900,000

Production which usually runs a quarter million or more units ahead of sales, will also come out close to 5.9 million. If defense spending increases as much as present talk warrants, auto output can climb over the 6 million mark for the fifth time in nine years.

Exhaust Notes

• Ford hopes it won't have to go to any more unit body construction until after 1960. One reason: It's estimated the changeover for assembly line conveyors alone could cost more than $750 million.

• American Motors Corp. reports an indicated net profit of more than $3 million in its first 1958 fiscal quarter which ended Dec. 31. President George Romney says the company is shooting for 180,000 sales in fiscal '58.

• GM's Detroit Diesel Engine Div. is building a 289,000 sq-ft addition which will house all final assembly, testing, and shipping facilities at its plant near Detroit. The unit will be completed in May.

• The switch to dual headlights has resulted in a sales surge for C. M. Hall Lamp Co., Detroit. Its 1958 sales will reach $9 million, compared with $5.3 million last year. Earnings are almost triple 1956's.

• Buick has developed an electronic device which measures the recovery rate of air springs and shows the results on an oscilloscope. The GM division also reports it has installed 1 million power brakes in less than five years.

• Chrysler Corp. is opening a sales and service training center in Newark, Del. Part of its programs for keeping dealers (and customers) happy, the facility will be in operation this year. It will serve 850 east coast dealers.

U. S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,617
May	531,365	471,673
June	500,271	430,373
July	495,629	448,876
August	524,354	402,575
September	284,265	190,726
October	327,362	389,061
November	578,601	580,803
December	534,723	597,226
Totals	6,107,822	5,801,864

Week Ended	1957	1956
Dec. 7	139,506	167,576
Dec. 14	145,503	158,431
Dec. 21	140,447	154,832
Dec. 28	79,945	99,577
Jan. 4	77,812†	91,130
Jan. 11	135,000*	149,995

Source: *Ward's Automotive Reports*. †Preliminary. *Estimated by STEEL.

"BIG SQUEEZE" in Birmingham

200 ton Verson Press dishes steel plate for storage tanks at Hammond Iron Works

Do you put the "Big Squeeze" on metal? Here's how Hammond Iron Works does it at their Birmingham, Alabama, plant. This recently installed 200 ton Verson Hydraulic Flanging Press dishes heavy steel plate for the wide variety of storage tanks manufactured by Hammond.

Gap depth is 72" (from centerline of cylinders to back of frame), more than ample for a work piece such as this section for a radial cone elevated water tank. The press has a fast advance speed of 388" per minute; pressing speed, 38" per minute; and fast return speed, 520" per minute.

The down-acting cylinder has a 36" stroke; the bed liftout cylinder, a stroke of 18". Ram area is 30" x 30" and the bolster is 60" x 60".

Big job . . . small job . . . if it concerns the press forming of metals, come to Verson. Here a press is more than just a press . . . it's a production process, engineered and built to provide greater efficiency and production with higher profit potential. Put Verson's production know-how to work for you. Write or phone, today.

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A Verson Press for every job from 60 tons up.

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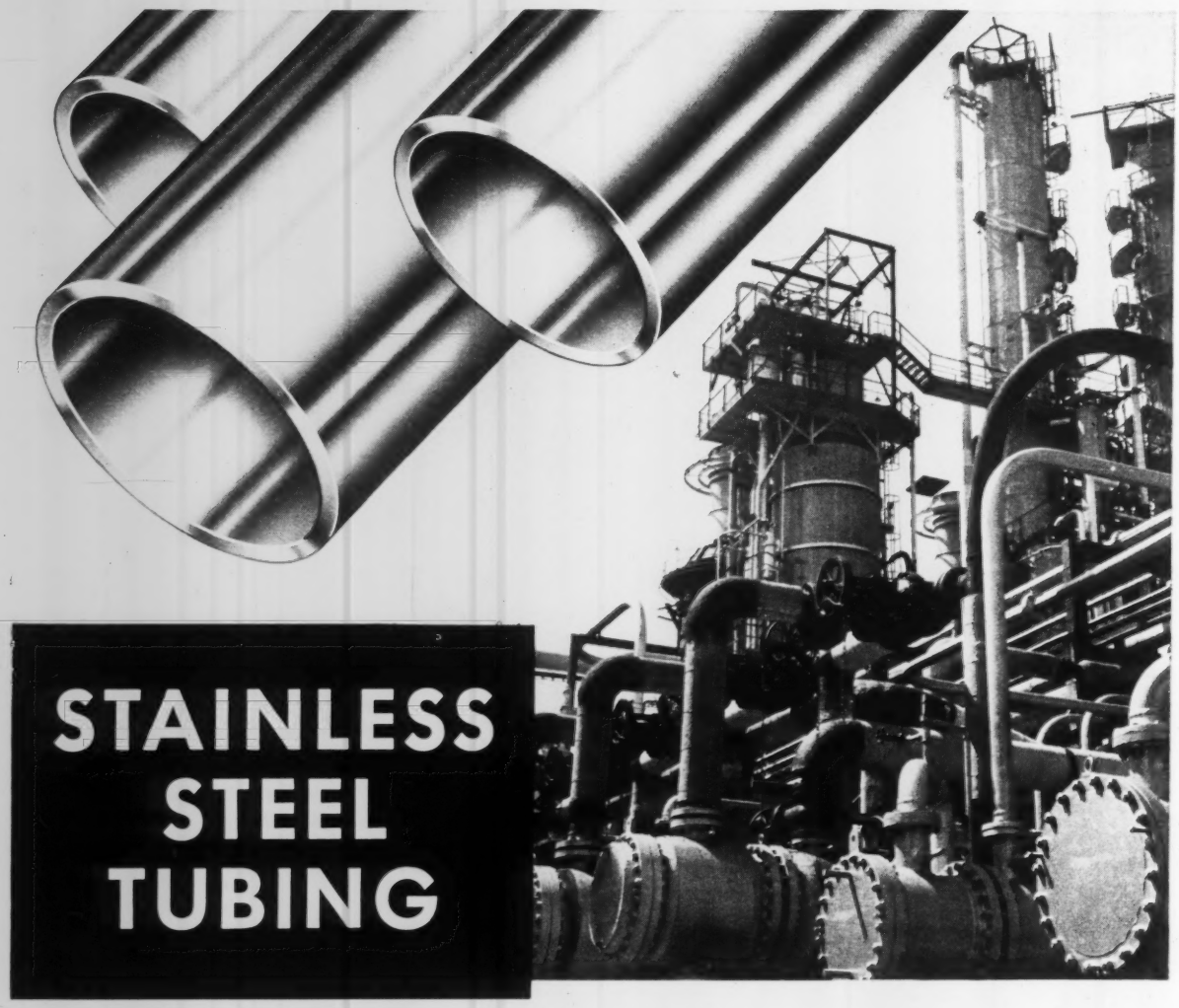

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VITAL SPECIFICATION WHERE TEMPERATURES AND THRUPUT ARE BOOSTED

Stainless steel tubing is a wise choice in any heat exchanger or evaporator . . . on high temperature and high velocity operations stainless is a must. It offers strength, heat and corrosion resistance superior to any other material. Inert, stainless neither adds nor detracts anything from the solutions it transports. In operation, replacement is less frequent and losses from down-time for repairs are practically eliminated. When ordering new processing equipment, always specify stainless for low cost operation . . . for quality re-tubing requirements, be sure to specify Damascus.

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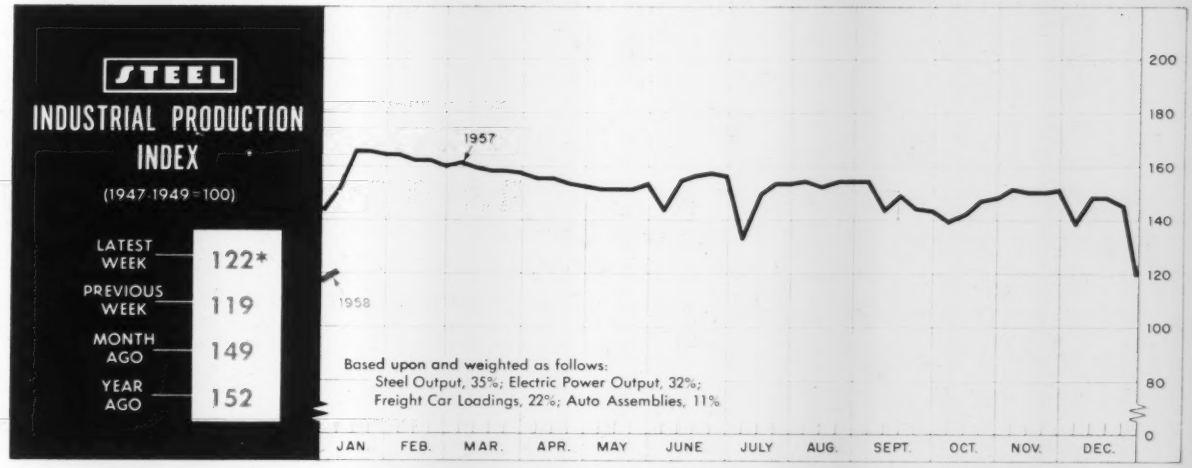
STAINLESS STEEL TUBING AND PIPE

GREENVILLE, PENNSYLVANIA



*Week ended Jan. 4.

Production Starts New Year in Low Gear

INDUSTRIAL PRODUCTION is starting the new year at its lowest level since 1954. The postholiday rebound is not expected to be as strong as it has been in the last three years.

STEEL's industrial production index registered a preliminary 122 (1947-49=100) for the New Year week ended Jan. 4. With the exception of the 1956 steel strike period, it has not dropped that low since late 1954. All four elements of the index contributed to the dip, and all will share the responsibility for sluggishness in the immediate future.

Steel—Despite optimistic year-end statements by most steel company executives, the industry's operations will not rise significantly in the next few weeks.

Hopes of an increase in new orders were fanned when furnaces were reactivated by Republic Steel Corp. (Youngstown District) and Youngstown Sheet & Tube Co. (Campbell Works). But other producers are still adjusting schedules downward. Bethlehem Steel Co. shut down another open-hearth furnace at its Lackawanna, N. Y., plant. Only 17 of its 35 furnaces are operating.

One of the most optimistic forecasts for the industry comes from A. M. Tredwell Jr., president of Sharon Steel Corp., Sharon, Pa. Mr. Tredwell says a target of 116 million tons is not out of reason. "Manufacturers' steel inventories have a way of disappearing almost overnight, and because of other factors in the economic picture, it is our belief that steel production will improve as we get into 1958," he declares.

Autos—Reflecting the softness in retail sales since the introduction of '58 models, auto producers are cutting their first quarter schedules 13 per cent, says *Ward's Automotive Reports*. This would put them 16.7 per cent below the corresponding period of 1957, which was no prize winner. It doesn't

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,548[1]	1,501	2,519
Electric Power Distributed (million kw-hr)	11,300[1]	11,218	11,671
Bituminous Coal Output (1000 tons)	5,725[1]	9,380	5,171
Petroleum Production (daily avg—1000 bbl)	6,900[1]	6,940	7,417
Construction Volume (*ENR*—millions)	$259.3	$273.8	$323.7
Auto, Truck Output, U. S., Canada (*Ward's*)	94,060[1]	96,255	108,781
TRADE			
Freight Car Loadings (1000 cars)	410[1]	410	562
Business Failures (Dun & Bradstreet)	166	276	174
Currency in Circulation (millions)[3]	$31,959	$32,089	$31,829
Dept. Store Sales (changes from year ago)[3]	+31%	+4%	+27%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,937	$20,911	$23,324
Federal Gross Debt (billions)	$275.1	$274.6	$276.2
Bond Volume, NYSE (millions)	$21.0	$21.0	$12.2
Stocks Sales, NYSE (thousands of shares)	13,067	9,908	10,614
Loans and Investments (billions)[4]	$88.5	$88.6	$87.9
U. S. Govt. Obligations Held (billions)[4]	$26.1	$26.0	$26.7
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.92
STEEL's Nonferrous Metal Price Index[6]	206.4	206.4	251.0
All Commodities[7]	118.4	118.4	116.3
Commodities Other Than Farm & Foods[7]	125.8	125.8	124.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1958, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

Cold Heading Cost Savings

Actual Cost Cuts As High As 70%

The most important consideration we can point out to the designer or purchaser of fasteners and small parts is that any part which can be machined from rod stock is also potentially available from the cold heading manufacturer. This technique offers speed of production, without scrap loss, plus superior strength and appearance for low cost and high design efficiency.

The designer need not be restricted to standard fastener sizes when they do not meet the requirements of his application. It is often much less expensive to specify a rivet, nail or screw to meet the task exactly as the application requires, than it is to compromise its function for the sake of "standards." While there is nothing mysterious about the cold heading process, experience has proved it to be of inestimable value for getting maximum quality and output at a minimum cost. While the really spectacular advantages in cost show up in runs of several thousand pieces, we are also able to take care of short run requirements. We welcome and expect manufacturers to come to us for advice and assistance concerning their fastener problems.

Given complete specifications, including a drawing and an idea of the application, we can quickly tell you whether or not it will be advantageous to have your fastener or part JOB-DESIGNED by HASSALL. The remaining important aspect of our service to you is the ability to get into production quickly and make prompt shipment.

Write for a copy of our new booklet, "What the Designer Should Know about Cold Heading".

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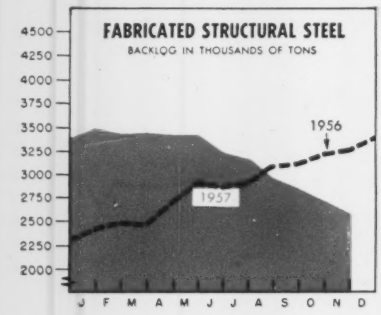
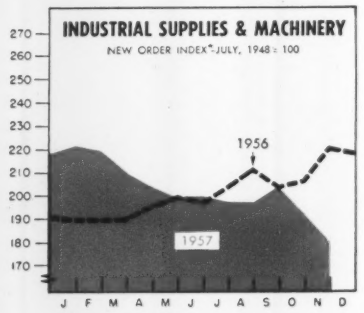
THE BUSINESS TREND





	Shipments 1957	Shipments 1956	Backlogs 1957	Backlogs 1956
Jan.	262.2	251.5	3,476	2,408
Feb.	278.5	285.4	3,436	2,476
Mar.	305.0	306.8	3,454	2,463
Apr.	313.6	289.6	3,416	2,687
May	329.6	306.2	3,417	2,896
June	329.3	284.7	3,220	2,859
July	303.5	165.5	3,138	2,904
Aug.	333.1	213.5	2,962	3,076
Sept.	294.7	240.9	2,846	3,108
Oct.	331.0	287.6	2,683	3,215
Nov.	293.4	276.0	2,564	3,252
Dec.	....	297.8	....	3,373
Total	....	3,205.5		

American Institute of Steel Construction.

	1957	1956	1955
Jan.	221	190	160
Feb.	219	190	166
Mar.	210	190	171
Apr.	203	195	172
May	199	199	177
June	199	197	189
July	197	203	182
Aug.	197	211	186
Sept.	203	203	196
Oct.	192	206	195
Nov.	180	220	194
Dec.	...	218	191

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs'. Assn.

Charts copyright, 1958, STEEL.

mean that 1958 will be a bust for the auto industry, but most forecasters think that fewer than 6 million cars will be produced in calendar 1958. Any pickup will be temporary, which means the index will lack the support it had from this segment of metalworking throughout most of last year.

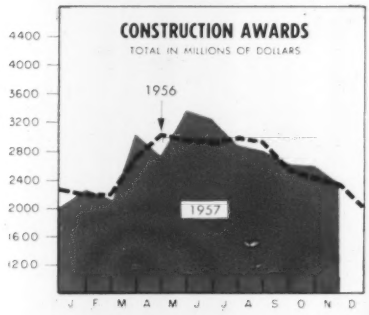
Freight Carloadings—Railroads had one of their poorer years in 1957, showing a decline in carloadings of 6.2 per cent from the 1956 level. Toward the end of the year, the deficit was increasing rapidly, and the trend has not stopped. The 13 regional Shippers Advisory Boards predict that carloadings during the first quarter will fall 3.8 per cent short of those in the corresponding period of 1957.

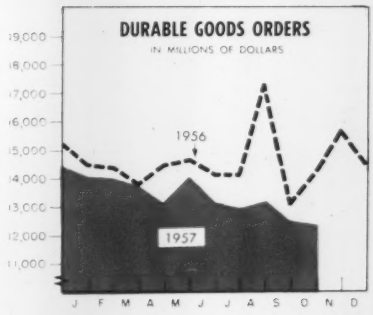
For the last couple of years, the estimates have been well above the final totals. So this segment of the index could be even weaker than it has been the last few weeks.

Electricity — During the latter months of 1957, this was the only segment of the index that provided a strong plus factor over prior years. Now it's losing steam. During the week ended Dec. 28, the nation's consumption of electricity measured 11.218 billion kw-hr, a scant 0.2 per cent ahead of the corresponding year-ago week. During the first week in 1958, output of electric energy may have fallen behind the mark of the comparable 1957 period. It would be the first time that has happened in recent years.

However, expansion in the electric utility industry is going ahead at full speed. J. W. McAfee, president of Edison Electric Institute, says a record 16,250,000 kw of new power generating capacity is scheduled for service this year. This is nearly 4 million kw more capacity than the industry installed in 1955, the record year. It will cost the utilities $3.9 billion for new construction, exceeding last year's outlay by $200 million.

Reverse Trend—The hope—and expectation—of most businessmen is that the trend of 1957 will be reversed in 1958. Typical is the comment of Donn D. Greenshields, president of Pittsburgh Screw & Bolt Corp., Pittsburgh. "I can't help but think 1958 will be comparable to 1957. But I look for a reversal in the trend of activity. While 1957 had three good quarters with a downturn in the final period, 1958 appears to be in for a slow first quarter with a gradual increase after that."





	Total		Building	
	1957	1956	1957	1956
Jan.	2,299.6	2,221.1	1,730.7	1,596.5
Feb.	2,161.0	2,229.5	1,695.5	1,694.9
Mar.	3,078.0	2,769.5	2,199.7	2,250.3
Apr.	2,776.4	3,045.5	2,069.7	2,392.3
May	3,399.5	2,980.2	2,416.8	2,317.3
June	3,243.5	2,947.5	2,341.5	2,226.5
July	2,900.7	3,013.0	2,247.6	2,217.5
Aug.	2,818.0	2,953.3	2,291.8	2,157.7
Sept.	2,624.9	2,575.1	2,092.2	1,977.6
Oct.	2,613.8	2,443.0	2,075.6	1,914.6
Nov.	2,370.7	2,377.3	1,808.5	1,869.3
Dec.	.....	2,057.2	.....	1,455.6
Totals	.....	31,612.2	.....	24,070.0

F. W. Dodge Corp.

	New Orders*		Sales*	
	1957	1956	1957	1956
Jan.	14,176	14,449	14,941	13,832
Feb.	14,102	14,374	14,808	13,824
Mar.	13,853	13,771	14,198	13,252
Apr.	13,234	14,468	14,254	13,723
May	14,115	14,654	14,296	13,570
June	13,249	14,093	14,207	13,587
July	13,005	14,087	14,573	13,021
Aug.	13,160	17,342	14,297	13,723
Sept.	12,519	13,042	14,132	13,449
Oct.	12,350†	14,312	13,943†	14,393
Nov.	.....	15,776	.....	14,249
Dec.	.....	14,543	.....	14,526

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.

Chiefs Look Up

Chief executives apparently are holding out for another good year, according to a recent survey by Dun & Bradstreet Inc. Presidents of 109 companies (most of them blue chip) view the general economy with uncertainty, but they feel their companies will forge ahead. While only 25 per cent are just as confident about the economy as they were a year ago, 53 per cent expect their companies to make a better profit showing this year than last. Nearly three-fifths believe their output in 1958 will top last year's by 2 to 15 per cent. Almost 25 per cent are fearful of a decline ranging from 1 to 30 per cent.

Some Improve, Some Don't

The rolling adjustment continues. Last week, Clark Equipment Co. recalled 1200 workers laid off last month at its Jackson, Mich., truck transmission plant. About 100 of the 300 workers laid off at the Benton Harbor, Mich., construction machinery plant have been recalled.

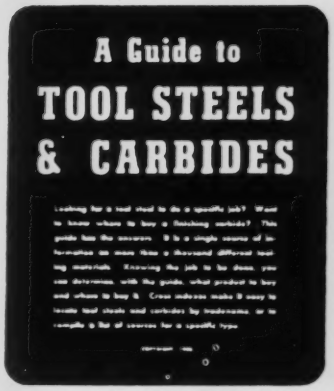
But in Peoria, Ill., Caterpillar Tractor Co. is planning further cutbacks at its main plant to reduce inventories. It will go on a four day week rather than reduce its work force.

Trends Fore and Aft

• Shipments of fabricated structural steel in November continued to maintain their edge over the 1956 pace (see table, Page 54), but new orders fell farther behind. Through 11 months, bookings lagged behind the year-ago figure by 26 per cent, resulting in a further drop in the backlog.

• The new order index of the American Supply & Machinery Manufacturers' Association declined for the second straight month in November and hit 180 (July, 1948 = 100), a 31-month low. The index (see chart, Page 54) has fluctuated in a relatively narrow range for more than two years.

• Output of metal cans is expected to resume its annual gain (about 3 per cent) in 1958 after a temporary setback in 1957, according to American Can Co. Output in 1958 will be 41.5 billion to 42 billion, compared with about 40.2 billion units last year. The 1957 decline of about 4 per cent was due to a drop of more than 50 million cases in fruit and vegetable packs.



HERE'S HELP for your tooling problems

Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

40 PAGES

Copies of the Guide to Tool Steels & Carbides are available from Editorial Service, STEEL, Penton Bldg., Cleveland 13, O., at the following prices:

1 to 10	$2.00 ea.
11 to 50	1.90 ea.
51 to 100	1.80 ea.
101 to 200	1.70 ea.
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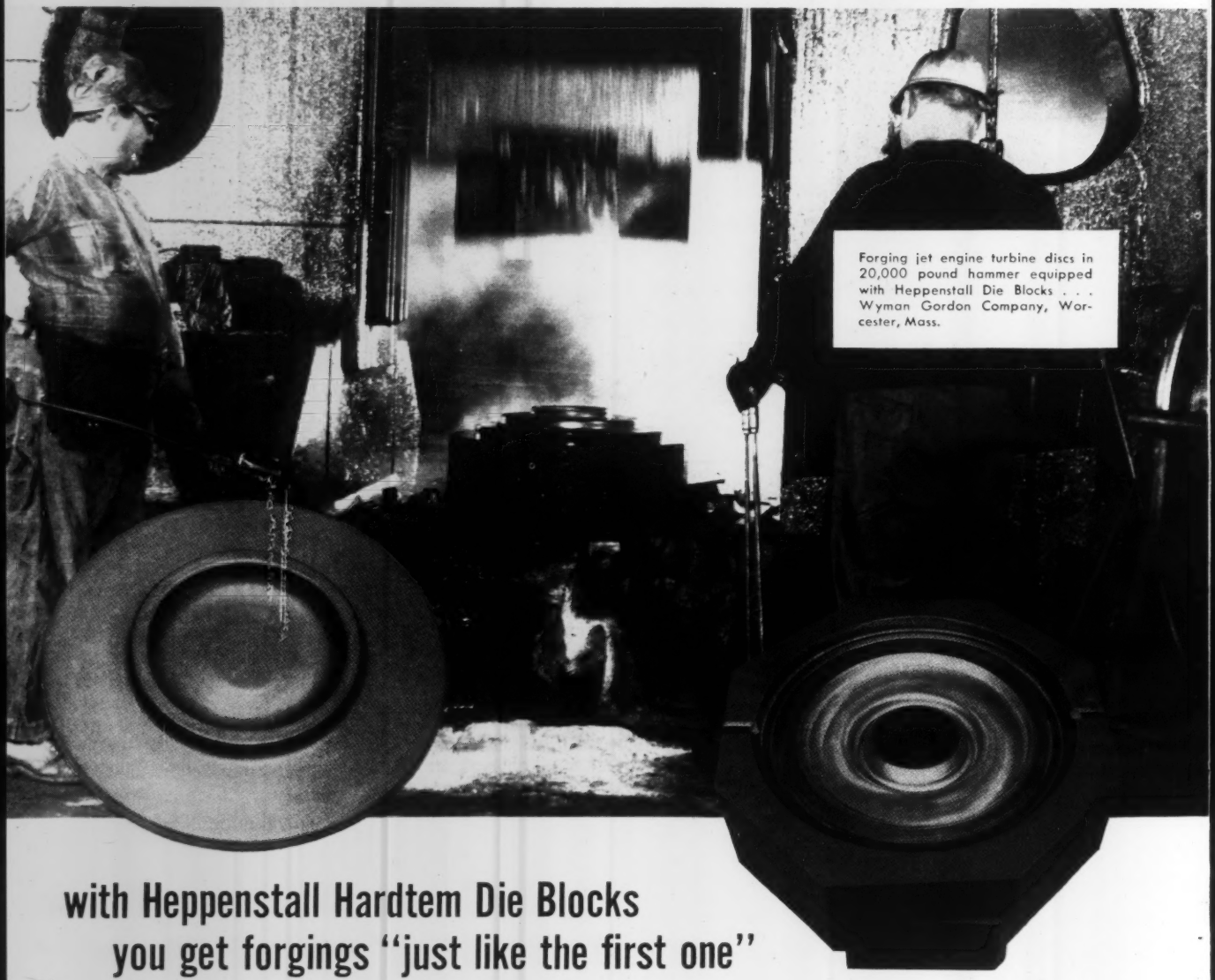
Forgings that ***FLY*** must meet rigid tolerances



Forging jet engine turbine discs in 20,000 pound hammer equipped with Heppenstall Die Blocks . . . Wyman Gordon Company, Worcester, Mass.

with Heppenstall Hardtem Die Blocks you get forgings "just like the first one"

Tolerances are especially close for these jet engine turbine disc forgings. That's why they're forged in Heppenstall Hardtem Die Blocks. For this job, Wyman Gordon Company selected Hardtem "B" Blocks.

Holding dimensions for long runs is only one of the well known characteristics of Heppenstall Hardtem Die Blocks.

Machinability of Heppenstall Hardtem rates equally high with veteran die sinkers. When they lay out a design on Hardtem, they expect and *get* savings in cutting time, longer tool life, and a more accurate sinking.

Forged on all six faces from special Heppenstall Steel, Hardtem and other Heppenstall Die Steels are manufactured in a wide range of hardnesses to match varying customer requirements of application and machinability. If you're looking for better die block performance, contact your Heppenstall Representative.

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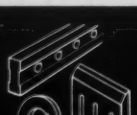
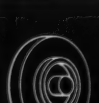
DIE BLOCKS

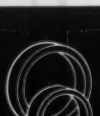
MATERIALS HANDLING EQUIPMENT



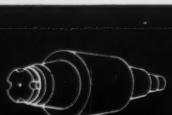
KNIVES



FORGINGS



RINGS



BACK-UP ROLL SLEEVES

HEPPENSTALL

. . . the most dependable name in die blocks

PITTSBURGH 1, PENNSYLVANIA

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Weirton supt.-blast furnaces

HERBERT M. WEED
Anaconda Sales v. p.

WILLIAM E. DAILY
Southern Fabricating sales post

E. F. MARTIN
Bethlehem v. p.-operations

J. Harold Taylor was named superintendent of blast furnaces and sintering plants, **Weirton Steel Co.**, Weirton, W. Va., division of National Steel Corp. He succeeds **A. M. Baker,** retired. Mr. Taylor is replaced as assistant superintendent by **Paul N. Neel. Fred G. Brown** was made assistant to vice president-sales. He is succeeded as general sales manager, coated sheet products, by **Oscar V. Johnston. W. C. Worley,** Detroit district sales manager, moves to Weirton as general sales manager, hot and cold rolled sheets, to succeed **E. W. Gescheider,** retired. **W. J. Myers** succeeds Mr. Worley at Detroit, where **A. Dean Pierce** becomes assistant sales manager.

Herbert M. Weed was elected vice president, **Anaconda Sales Co.**, New York, subsidiary of Anaconda Co. **W. E. Kennedy** retired as executive vice president; **Clarence Glass** as vice president. Mr. Weed also was elected vice president of Anaconda Sales's subsidiary, Anaconda Export Co.

Donald M. Patterson was elected vice president and general sales manager, manufacturing divisions, **Motch & Merryweather Machinery Co.,** which include both the facilities at Euclid, Ohio, and the Avey Div. at Cincinnati. He was vice president-sales manager, Avey Drilling Machine Co., before its merger with Motch & Merryweather. **Warren R. Lowe** was made general manager, **Avey Div.; George W. Drees,** assistant general manager; **Eugene Reutman,** in charge of sales.

William E. Daily was appointed sales manager of **Southern Fabricating Co. Inc.'s** new steel tube division, Sheffield, Ala.

Fabricated Steel Inc., Hamilton, Ohio, elected **Henry A. Rentschler** president; **William J. Wolf,** vice president; and **Fred B. Helvey,** secretary-treasurer. Mr. Rentschler, who joined the firm in February, 1957, previously served in an executive capacity with Baldwin-Lima-Hamilton Corp. Mr. Wolf served as president of Fabricated Steel since 1951, when it was separated from Southwestern Ohio Steel Inc. He was founder of both Southwestern Ohio Steel and Fabricated Steel, and active in the management of both companies. **R. W. Tillett** was made plant manager of Fabricated Steel. He formerly handled purchasing and production.

Caterpillar Tractor Co., Peoria, Ill., appointed **Walter H. Zurhorst** plant engineer, manufacturing general office. He is succeeded as Peoria plant engineer by **Harry R. McNeely.** Mr. Zurhorst succeeds **F. C. Gedge,** who will serve as a plant engineering consultant until retirement in 1958.

At the Michigan City, Ind., plant of **Pullman-Standard Car Mfg. Co., Oscar E. Rothfuchs** was promoted from general superintendent to assistant manager of works; **M. B. Burns,** from assistant general superintendent to general superintendent; **J. A. Hampel,** from labor rate technician to assistant general superintendent of production.

E. F. Martin was appointed vice president in charge of steel operations, **Bethlehem Steel Co.**, Bethlehem, Pa., to succeed **S. J. Cort,** retired. Mr. Martin was general manager of Lackawanna, N. Y., plant. **H. C. Crawford,** vice president-traffic, has retired and is succeeded by **F. M. Huffman,** assistant vice president-traffic.

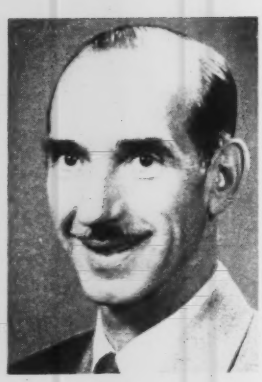
James F. Jones was appointed manager of **A. O. Smith Corp.'s** automotive division, in charge of the Milwaukee and Granite City, Ill., facilities. Other changes in the automotive division include: **J. R. Parker,** named director of sales and engineering; **W. R. Wilson,** assistant to the manager, a new post; and **N. B. Granberg,** manufacturing engineering.

Koehring Div., Koehring Co., Milwaukee, promoted **Nicholas J. Decker** from works manager to general works manager; **Robert Williams** from cost reduction manager to works manager; **Peter Miles** from assistant foundry manager to foundry manager.

Nick E. Staresina was appointed plant manager of the Gary, Ind., plant of **Gary Screw & Bolt Div.**, Pittsburgh Screw & Bolt Corp. He has been with Lamson & Sessions Co. for 28 years.

James A. Maggetti was named assistant plant manager of **Kaiser Steel Corp.'s** Napa, Calif., plant, responsible for sales, production, and certain administrative functions relating to the operation of the plant. In addition, he con-

NORRIS B. McFARLANE



JAMES A. BRIGHT

Pittsburgh Metallurgical vice presidents

R. E. REIMER

JOHN LAWRENCE

executive vice presidents at Dresser Industries

tinues as manager of the plant's planning and estimating department.

Pittsburgh Metallurgical Co. Inc., Pittsburgh, elected **Norris B. McFarlane** and **James A. Bright** vice presidents. Mr. McFarlane continues as assistant general manager and sales manager. Mr. Bright continues as head of the engineering department.

Latrobe Steel Co., Latrobe, Pa., established a new marketing department. It named **John L. Wandrisco** manager of marketing; **Robert A. Ferguson**, manager of sales promotion.

Don DeMerce was named plant manager, **Mercast Mfg. Corp.**, La Verne, Calif.

Ralph Grimm was elected president and chairman, **Collins Instrument Co.**, San Diego, Calif.

George L. Ziegler was made manager of quality control for **Worthington Corp.**, Buffalo. He is succeeded as manager of parts service by **Alfred H. Cercone.**

Robert Jacobson was made director of purchases, **Reading Metals Refinery Corp.**, New York, subsidiary of Reading Tube Corp.

Richard S. Huested was made manager of operations for **Westinghouse Electric Corp.'s** aviation gas turbine division, Kansas City, Mo.

L. B. Howerton was elected president, **Rex Precision Products Inc.**, Culver City, Calif. **Geza Demeter** was elected vice president.

R. E. Reimer was elected executive vice president, **Dresser Industries Inc.**, Dallas. He continues as treasurer. **John Lawrence**, who recently resigned as president of Joy Mfg. Co to join Dresser as a vice president, was also elected an executive vice president.

Percy L. Spencer was elected senior vice president, **Raytheon Mfg. Co.**, Waltham, Mass. He continues to serve as manager of the Microwave & Power Tube Div.

Howard W. Brandt was made general manager, Kalamazoo, Mich., division, **New York Air Brake Co.** He recently joined the division as assistant general manager. Previously he was general manager, Rochester, N. Y., division, General Motors Corp.

N. H. Schlegel fills the new post of vice president-marketing, **Cory Corp.**, Chicago. He was vice president-sales and advertising.

Joel H. Morris, chief engineer of **F. H. McGraw & Co.**, New York, was named assistant to the president.

James M. Matthews was made director of sales, magnetic and electronic materials, **Allegheny Ludlum Steel Corp.**, Pittsburgh. He was product manager-silicon electrical steel sales.

R. E. Kirby was appointed manager of **Westinghouse Electric Corp.'s** electronics operation at Baltimore. **J. M. Beggs** succeeds Mr. Kirby as manager of the company's ordnance department.

M. J. Yost was named sales manager for industrial engines, marine and industrial engine division, **Chrysler Corp.**, Detroit. He was manager of the division's west coast office.

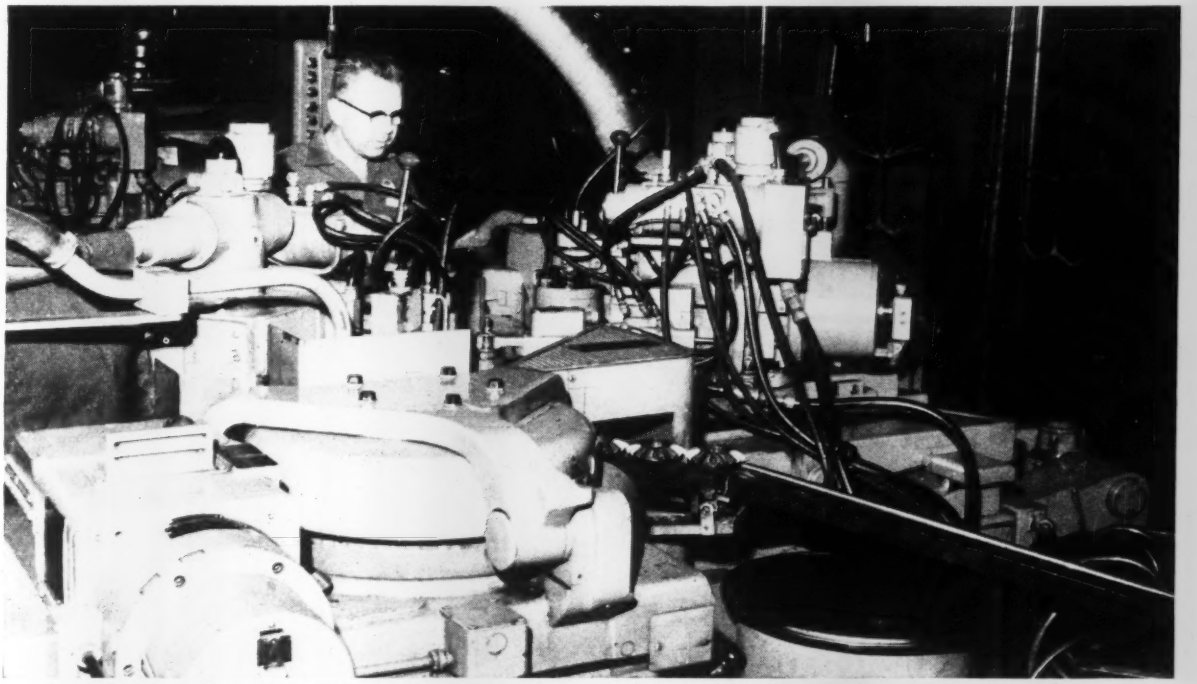
W. R. Phillips was made manager of **Ford Motor Co.'s** Des Moines, Iowa, implement plant to succeed **C. M. Rhoten**, named manager of the Highland Park, Mich., tractor plant. Mr. Phillips was production manager of the Des Moines plant. Mr. Rhoten succeeds **J. M. Waggoner**, retired. **I. H. Niffin**, production manager of the tractor plant, was made assistant plant manager. **F. A. Wagoner** was named production manager.

Orval W. Jones joined **Arrow Tool Co. Inc.**, Wethersfield, Conn., as sales engineer. He was in the purchasing division of International Business Machines Corp.'s Poughkeepsie, N. Y., plant.

Ralph L. Powell was made manager of the engine, forge, and foundry plants in Buffalo for **Chevrolet Motor Div.**, General Motors Corp. He succeeds **Alton A. Way**, now on special assignment.

Walter W. Finke was elected a vice president, **Minneapolis - Honeywell Regulator Co.** He continues as president of the Datamatic Div., Newton Highlands, Mass.

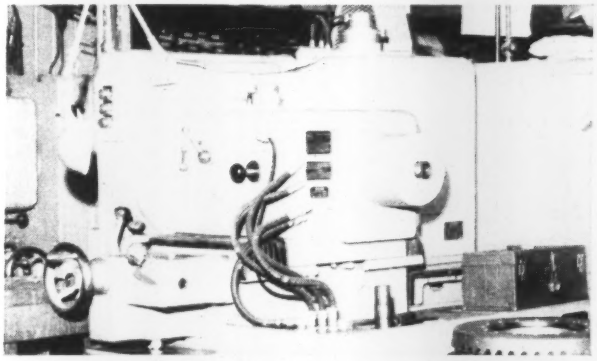
Paul Boggs, vice president-sales, was elected president of **Electrolux Corp.**, New York. **George Holmen**, vice president-finance, becomes vice chairman of the board and chief executive officer. **G. E. Lofgren** becomes vice president-manufacturing. **Walter Dietz**, former president, and **A. F. Murray**, vice



This gear-cutting machine operates two shifts a day, turning out bevel gears. The Aeroquip Hose Lines have been operating more than 4 years.

"We've Used Aeroquip Hose Lines For Over Four Years . . . Never Had A Failure," Reports Maintenance Man

AT EATON MANUFACTURING COMPANY, AXLE DIVISION, CLEVELAND



Exposure to cutting oils, metal chips and constant flexing fail to damage these rugged Aeroquip Hose Lines.

On automatic and semi-automatic machinery in Eaton's Cleveland axle plant, flexible hose lines are important hydraulic system components.

Aeroquip Hose and Reusable Fittings were first used almost five years ago, on a small scale. They performed so well that Eaton maintenance men now systematically replace other hose and tubing with Aeroquip Hose Lines. To date, no Aeroquip Hose Line installation has required replacement due to any operating failure.

You can cut maintenance costs and add dependability to your equipment, too. Just call the Aeroquip Distributor listed in your Yellow Page Phone Book, or write us.

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WILLIAM A. SURZIK

NORMAN E. PROCHASKA

Cleveland Instrument appointments

J. J. OFFUTT

A. R. BARNETT

A. P. Green Fire Brick executives

president-manufacturing, have retired.

Cleveland Instrument Co., Cleveland, named **William A. Surzik** plant manager; **Norman E. Prochaska**, manager of machine control systems.

Arthur E. Ackerman was elected vice president-sales, **Millers Falls Co.**, Greenfield, Mass. He was general sales manager.

Ray J. Dervey, executive vice president, was named president, **Waterman-Waterbury Co.**, Minneapolis. He succeeds **David Sedgwick**, resigned.

Quilbert Q. Wales, vice president, succeeds **Verdie A. Dodds** (retired) as president of **Brown-Wales Co.**, Cambridge, Mass.

Paul E. Bening was appointed sales manager for **Thorsen Mfg. Co.**, Oakland, Calif.

Robert W. Strasser was named district sales representative in Republic Steel Corp.'s **Berger Div.** for Pittsburgh and eastern Pennsylvania. He succeeds **Edward Shockey**, retired.

Frank E. Sisk and **Walter N. Mullen** were made district sales managers for Rockwell Mfg. Co.'s **Delta Power Tool Div.** Mr. Sisk is at Newark, Calif. Mr. Mullen is at Decatur, Ga.

National Steel Corp. appointed **A. W. Pettit** to succeed **D. M. Price**, retired, as Cleveland district sales manager. **L. A. Stewart** succeeds **E. F. Conroy**, retired, as St. Louis district sales manager.

A. P. Green Fire Brick Co., Mexico, Mo., elected **J. J. Offutt** vice president and director of sales. Vice President **A. R. Barnett** was made director of A. P. Green domestic subsidiaries, including Canada.

Philip DiFalco joined **LeMaire Tool & Mfg. Co.**, Dearborn, Mich., as chief engineer. He served in a similar capacity with Spartan Design Inc. for the last year. Before that, he was technical assistant to the production engineering manager of Ford Motor Co.

Bernard C. Harney was appointed sales manager, bar feed division, **Lipe - Rollway Corp.**, Syracuse, N. Y. He was assistant to the chief engineer at Lipe.

Edward A. Cleary Jr. was elected vice president-manufacturing division, **Warner Electric Brake & Clutch Co.**, Beloit, Wis.

Standard Steel Corp. appointed **Rea Anderson** chief metallurgist and head of the quality control department in the Los Angeles plant.

Latrobe Steel Co. named **Marcus W. Saxmann III** assistant district sales manager, Cleveland branch.

Ralph H. Waddington, James C. Parlee, Richard A. Cabell, and **Paul Queneau** were elected assistant vice presidents of **International Nickel Co. of Canada Ltd.**, Toronto, Ont. Mr. Waddington also was made general manager of the Ontario division; Mr. Parlee, general manager, Manitoba division. Messrs. Cabell and Queneau were elected vice presidents of International Nickel Co. Inc., U. S. subsidiary.

Alten Foundry & Machine Works Inc., Lancaster, Ohio, appointed **L. C. Gruber** manager of its Plant No. 2. He was plant superintendent with Weinman Pump Mfg. Co.

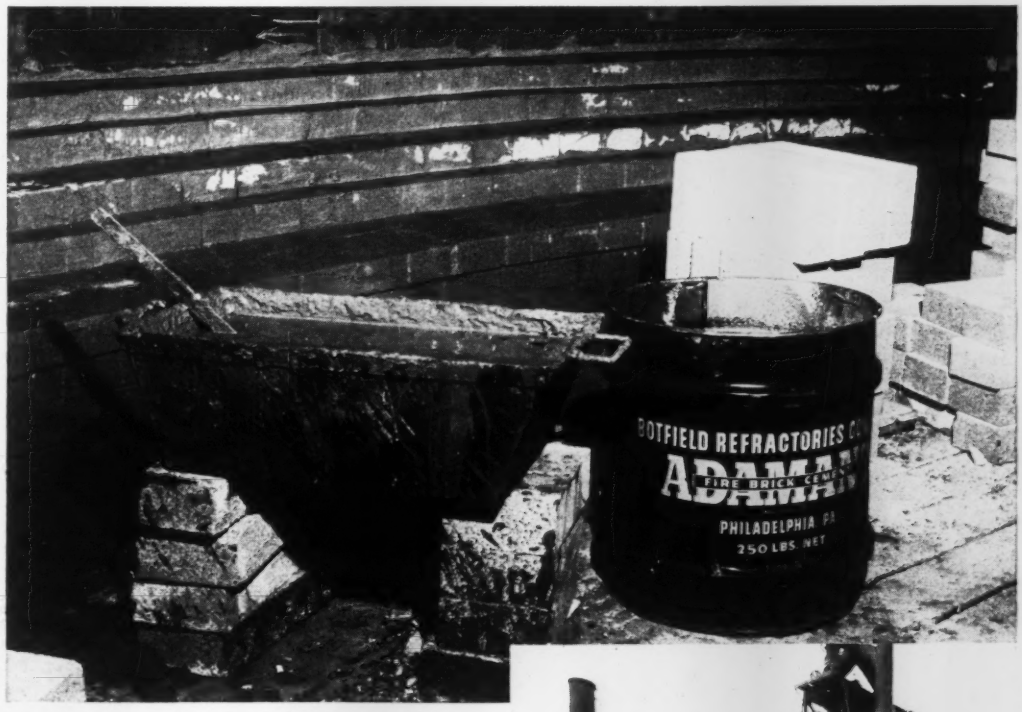
Dr. Lowell H. Milligan, former assistant director of research and development, was appointed associate director of research and development for **Norton Co.**, Worcester, Mass. **Dr. Neil N. Ault** was made assistant director of research and development, in charge of the refractory section. **Loring Coes Jr.** continues as assistant director of research and development, but will now be in charge of the exploratory research section. **Drs. Herbert F. G. Ueltz, Guy Ervin Jr.**, and **Leo P. Tarasov** were appointed research associates, reporting to Mr. Coes. **Dr. Newman W. Thibault** continues as assistant director of research and development, but will now be in charge of the abrasive section.

Robert D. Hawkins was named assistant factory manager of **Republic Rubber Div.**, Lee Rubber & Tire Corp., Youngstown.

H. A. Rehfeld was made sales manager, eastern division, **American MonoRail Co.**, Cleveland. He succeeds **W. P. Conway**, resigned to become general manager for Production Equipment Co., Meriden, Conn. Mr. Rehfeld was manager of the Atlantic district. **L. R. McEachern** was made sales manager, southeastern division.

James H. Brockway was made sales manager, tool division, **Barcalo**

THE CHOICE OF SEVERAL MAJOR STEEL PRODUCERS



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FIRE BRICK CEMENT

. . . FOR BONDING THE FIRE BRICK THROUGHOUT IN BLAST FURNACE REBUILDS

With today's high costs—protect your brickwork against spalling, gas penetration and slag attack . . . with the best fire brick cement available, ADAMANT.

ADAMANT is the only cement to give you maximum bonding strength, no shrinkage cracks, smooth, thin, economical joints, and proper heat resistance . . . designed for use with first quality and super duty brick.

Dependable quality, ton after ton, year after year . . . ADAMANT is also the only cement that will store for long periods of time without hardening in the drum . . . comes ready-mixed in air-tight drums of 100, 250 and 500 lbs. Complete details in our new Bonding Mortars Bulletin No. 3. Yellow Pages of 'phone directory have your nearest ADAMANT Distributor.

Here and above—showing the "inside" and "outside" of Blast Furnace belonging to one of the nation's foremost Steel Producers . . . note liberal use of famous ADAMANT Fire Brick Cement.

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FOUNDED 1907
REFRACTORIES
ADAMANT and other ADA products
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NEGLIGIBLE DISTORTION

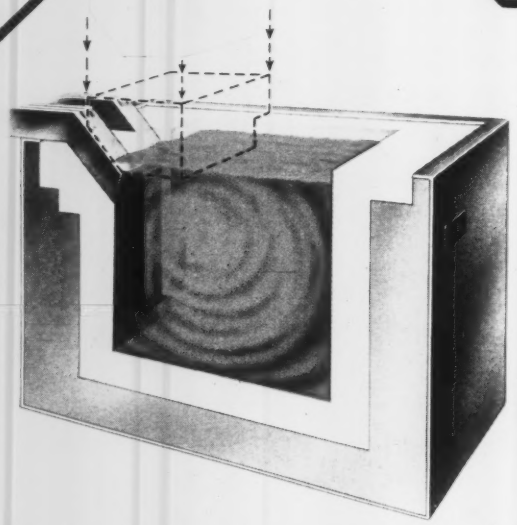
. . . Finish grinding can often be done **before** heat treating.

EASY SELECTIVE HEATING

. . . Just immerse the portion of the work you want to heat treat.

FAR FASTER, MORE UNIFORM HEATING

. . . for speedier production and better quality control.



MORE PRODUCTION

. . . in less space, with unskilled labor.

NO ATMOSPHERE PROBLEMS

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GREATER VERSATILITY

. . . Different operations such as carburizing and brazing or martempering can be combined in one heating of the work.

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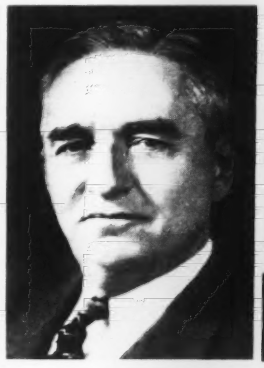
F. B. HERSCHBERGER
Sheffield indus. wire sales mgr.



EARL E. GRAY
Caspers Tin Plate president

WALTER J. KRUEL
Hallamore Electronics v. p.

Mfg. Co., Buffalo. He was vice president-sales, Reif-Rexoil Co.

W. O. Buffe was made sales manager, merchant wire products; **F. B. Herschberger,** sales manager, industrial wire, **Sheffield Div.,** Kansas City, Mo., Armco Steel Corp. They assume duties formerly performed by **G. P. Lacy,** now with Armco's new subsidiary, Union Wire Rope Corp.

Caspers Tin Plate Co., Chicago, elected **Earl E. Gray** president; **Bertram W. Bennett,** chairman. Mr. Gray was executive vice president. He succeeds Mr. Bennett, who served as president since 1938.

Ampco Metal Inc., Milwaukee, appointed three new sales managers, all reporting to J. P. Henry, vice president-general sales manager. They are **F. E. Garriott,** finished products; **I. S. Levinson,** technical products; **G. E. Brown,** field sales.

Edward J. Eggart was elected president, **Hettrick Mfg. Co.**, Toledo, Ohio. **W. I. Smith** resigned as chairman and president.

Hallamore Electronics Co., Anaheim, Calif., division of Siegler Corp., appointed **Walter J. Kruel** vice president-works manager; **Frank W. Lynch,** vice president-engineering. Mr. Kruel has been works manager for the last four months. Mr. Lynch, formerly with Northrop Aircraft Inc., succeeds **John Burke,** who was named executive vice president of the Hallamore Div.

Joseph Cassotta was made purchasing agent, instrument division, **Sterling Precision Corp.**, Port Washington, N. Y.

Donald W. Saladin was made assistant general superintendent, **Fairless Works,** Morrisville, Pa., U. S. Steel Corp.'s National Tube Div.

Robert A. Lubker was made director of research, **Alan Wood Steel Co.**, Conshohocken, Pa. He was manager of metals research, Armour Research Foundation, Chicago. **William M. Webb** was elected treasurer; **W. Bruce Cashmore,** secretary.

John J. Morrissey was named general manager of **General Drop Forge Corp.**, Buffalo, subsidiary of Dana Corp. He was assistant chief industrial engineer at Wyman Gordon Co.

E. George Hartmann was elected vice president-sales, **John A. Roebling's Sons Corp.**, a subsidiary of Colorado Fuel & Iron Corp. He is at the corporation's main office in Trenton, N. J. Mr. Hartmann was general product manager of Roebling's wire and cold rolled products division. He replaces **Ernest C. Low,** retired. **W. C. Palmer,** sales manager of the wire and cold rolled products division, replaces Mr. Hartmann as general product manager. **F. T. Updike** was made sales manager.

E. J. Cassella was promoted from assistant plant manager to plant manager, **Beaver Pipe Tools Inc.**, Warren, Ohio.

Gabriel Co., Cleveland, appointed **Joseph B. Cejka** general sales manager for electronics. He has responsibility for product and sales planning and administrative control for the Electronics and Ward Divisions of the corporation.

OBITUARIES...

C. Dudley Clawson, 55, president, **Ferro Corp.**, Cleveland, died Jan. 4.

W. C. Christianson, 50, general sales manager, **Trent Tube Co.**, subsidiary of Crucible Steel Co. of America at East Troy, Wis., died Dec. 21.

Richard K. West, president, **West Instrument Corp.**, Chicago, died Dec. 14.

Col. R. E. Drouin, 56, president, **Waterbury Screw Machine Products Co.**, Cheshire, Conn., died Dec. 14.

Robert G. Cady, sales manager and treasurer, **Ajax Flexible Coupling Co. Inc.**, Westfield, N. Y., died Dec. 12.

Elmer H. Martins, 46, manager of the sales order and billing department, **Falk Corp.**, Milwaukee, died Dec. 22.

Frank B. Foster, 79, head, **Frank B. Foster Inc.**, Pittsburgh, died Dec. 28.

8-year accelerated tests at HARVEY ALUMINUM prove LaSalle STRESSPROOF® and FATIGUE-PROOF® better than heat treated steel of even higher

...also cut costs by 25%

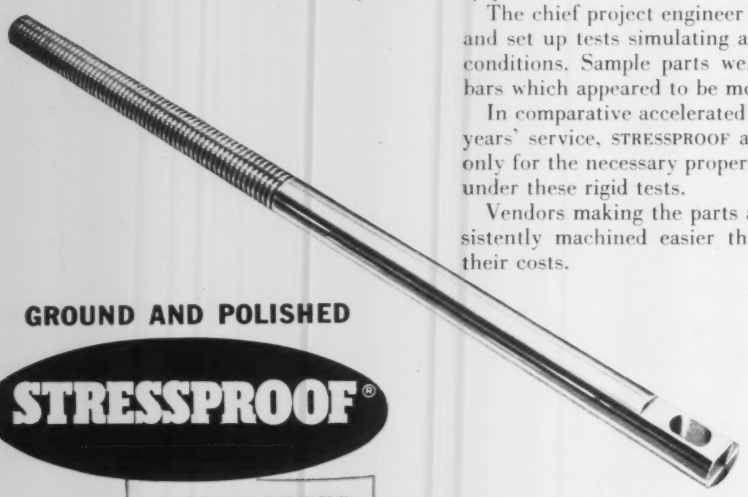
The design requirements of the new Harvey Aluminum Reduction Plant at The Dalles, Oregon, demanded the best available materials. Harvey is the largest independent fabricator of wrought aluminum mill products, and, *as a metallurgical concern, their manufacturing requirements go beyond ordinary interests.*

One of the vital components of the plant is the anode jack assembly. The assembly operates under a 60-ton load and under adverse conditions. Failures here cannot be tolerated because they would stop production and create a tough maintenance problem.

The chief project engineer knew he could not take chances . . . and set up tests simulating as nearly as possible actual operating conditions. Sample parts were made from those grades of steel bars which appeared to be most suitable.

In comparative accelerated tests, considered the equivalent of 8 years' service, STRESSPROOF and FATIGUE-PROOF were selected not only for the necessary properties but because they performed best under these rigid tests.

Vendors making the parts also found that these steel bars consistently machined easier than the heat treated steels and cut their costs.



GROUND AND POLISHED

STRESSPROOF®

WITH COPPER

PROVED BETTER THAN:

A-4140—Heat Treated Rc28-30

C-1040—Heat Treated Rc28-30

C-1144—Cold Drawn and Strain Relieved

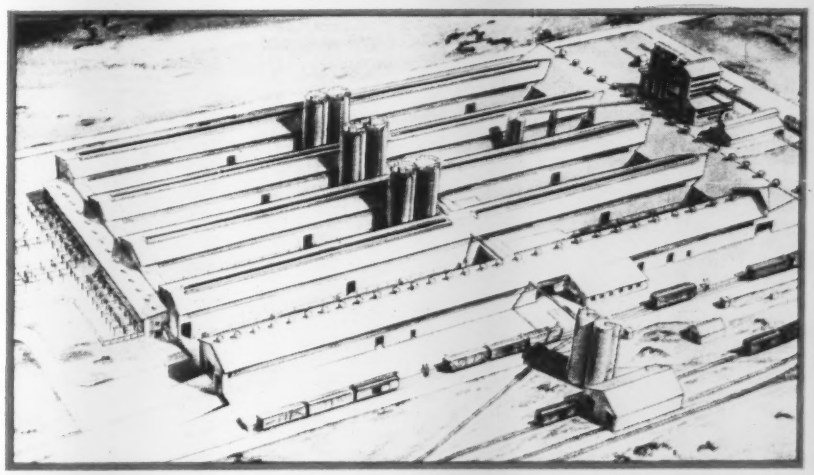
2,025 better shafts ...at 25% savings

TEST No. 1: After submitting sample shafts of each of the analyses shown at the left to the accelerated tests for wear, strength, and overload, STRESSPROOF anode shafts were proved superior. (1) STRESSPROOF gave consistent and faster machining. (2) STRESSPROOF shafts required no straightening. Other materials warped after machining. (3) STRESSPROOF showed excellent wear characteristics under applied load. (4) STRESSPROOF shafts were produced at a savings of 25% over the other materials tested.

La Salle **STEEL CO.**

1414 150th Street, Hammond, Indiana

steel bars
hardnesses



Harvey Aluminum Reduction Plant, The Dalles, Oregon.

fatigue-proof®
STEEL BARS

MADE BY **e.t.d.** PROCESS
Elevated Temperature Drawing

2,025 better worms ...at 25% savings

PROVED BETTER THAN:

A-4140—Heat Treated Rc35-38
A-4130—Heat Treated Rc35-38
A-5160—Heat Treated Rc35-38
C-1048—Heat Treated Rc38-40

TEST No. 2: Sample bars of each of the analyses listed at the left were also put through a test equivalent to 8 years' operation. After completion of tests, FATIGUE-PROOF steel showed excellent ability to work-harden and to withstand operating loads. Machinability was superior to the other grades tested and total cost of producing the worm gear was reduced by 25% with the use of FATIGUE-PROOF steel.

also available from your steel service center

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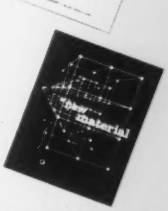
☐ Please send the newly published engineering report, "The Effect of Copper, Abnormally Heavy Drafts, Furnace Treatment and Die Practice on STRESSPROOF Steel Bars."



☐ Please send 24-page bulletin, "A New Material," which presents the results of more than one year's tests and reports on eight application case studies of La Salle FATIGUE-PROOF steel bars.

Tube Plant Opens

Superior Tube's new facilities at Wapakoneta, Ohio, boost capacity 30 per cent

SUPERIOR TUBE CO.'s million-dollar plant at Wapakoneta, Ohio, is in full production. It is equipped to make cathodes for electron tubes and cold-drawn tubing 0.01 to 0.50 in. in diameter.

The plant has more than three times the floor space of leased facilities previously occupied. It boosts production capacity for small tubing and cathodes 30 per cent.

Norristown Project—Superior is constructing an office building and mill addition at its general offices and plant near Norristown, Pa. Estimated to cost about $2 million, this project is part of a $5-million expansion program which began in 1956 and is scheduled for completion this year.

The company produces tubing in 121 different materials, including carbon, alloy, and stainless steels; nickel and nickel alloys; beryllium copper; titanium; and zirconium.

The company also operates a plant in Phoenixville, Pa., which makes photoformed parts and parts for nuclear reactors. It has four subsidiaries: Pacific Tube Co., Los Angeles (cold-finished steel tubing and bars); Johnson & Hoffman Mfg. Co., Mineola, N. Y. (precision stampings and deep-drawn parts in all metals); Fine Tubes Ltd., Surbiton, England (cathodes, small tubing made of nickel and stainless steel); and Moray Engineering Co. Ltd., Epsom, England (automotive, electrical, electronic hardware and assemblies).

To Make Process Controls

Ramo-Wooldridge Corp., Los Angeles, and Thompson Products Inc., Cleveland, formed a subsidiary, Thompson-Ramo-Wooldridge Products Inc., with headquarters at the Ramo-Wooldridge Center near the Los Angeles International Airport. The new company will specialize in production of industrial process control equipment, including digital control computers. Officers include: President, Dr. D. E. Wooldridge; general manager, Dr. J. F. Manildi; director of engineering, Dr. Montgomery Phister Jr.; director of marketing, R. E. Jacobson; and controller, R. J. Barrett Jr.

Ships Laminated Foil

Kaiser Aluminum & Chemical Corp.'s new foil processing plant at Belpre, Ohio, is making first shipments of laminated foil materials this month. The foil will be supplied by the company's new rolling mill at Ravenswood, W. Va.

Will Move Plant to Iowa

Cherry-Burrell Corp., Chicago, will move its Milwaukee operations to its 400,000 sq-ft plant in Cedar Rapids, Iowa. The transfer is expected to be completed by late February. The Milwaukee plant makes milk bottle filling and capping equipment and does contract production for other manufacturers. The Cedar Rapids plant turns out ice cream freezers, storage tanks, and processing equipment for the dairy and food industries.

Four Firms Renamed

Mallory-Sharon Titanium Corp., Niles, Ohio, changed its name to Mallory-Sharon Metals Corp.

LeMaire Tool & Mfg. Co., Dearborn, Mich., changed its name to LeMaire Machine Tool Co.

Aluminum Tubing Co., Jacksonville, Fla., changed its name to Roll-Weld Pipe & Tube Inc. The firm offers two new products: Steel and stainless pipe and tubing.

Friden Calculating Machine Co. Inc., San Leandro, Calif., changed its name to Friden Inc.

NEW PLANTS

Loma Machine Mfg. Co. Inc., New York, is constructing a plant addition at Alburtis, Pa. New facilities will include boring, milling, turning, shearing, bending, and welding equipment. The unit will be primarily for the production of circular saws, continuous casting machines, rolling mills, roller and stretcher levelers, tube processing lines, and other auxiliary equipment for the metallurgical industries.

Vanadium-Alloys Steel Co., Latrobe, Pa., completed a warehouse at Agawam (Springfield), Mass., which more than doubles its facilities in the New England territory.

CONSOLIDATIONS

National Steel Corp., Pittsburgh, purchased **Enamelstrip Corp.**, Allentown, Pa., manufacturer of enameled, lacquered, and laminated steel in coils. Arthur Uhleen will continue as executive vice president of the Allentown firm which will be operated as a subsidiary.

Vulcan Materials Co., Birmingham, merged with **Union Chemical & Materials Corp.**, Chicago, and **Lambert Bros. Inc.**, Knoxville, Tenn. Vulcan also purchased these companies: Brooks Sand & Gravel Co. and Tennessee Equipment Co., Kingsport, Tenn.; Asphalt Paving Materials Co., Chattanooga Rock Products Co., Wesco Materials Inc., and Wesco Contracting Co., Chattanooga, Tenn.; and Rockwood Slag Products Inc., Rockwood, Tenn.

Walker Mfg. Co., Racine, Wis., purchased **Galt Metal Industries Ltd.**, Galt, Ont., maker of stamped metal products. L. C. Askerman is vice president and general manager of the Canadian operation.

ASSOCIATIONS

C. E. Klumb, West Bend Equipment Corp., West Bend, Wis., was re-elected president of the **Association of Lift Truck & Portable Elevator Manufacturers**, Pittsburgh. George G. Raymond Jr., Raymond Corp., Greene, N. Y., was re-elected vice president.

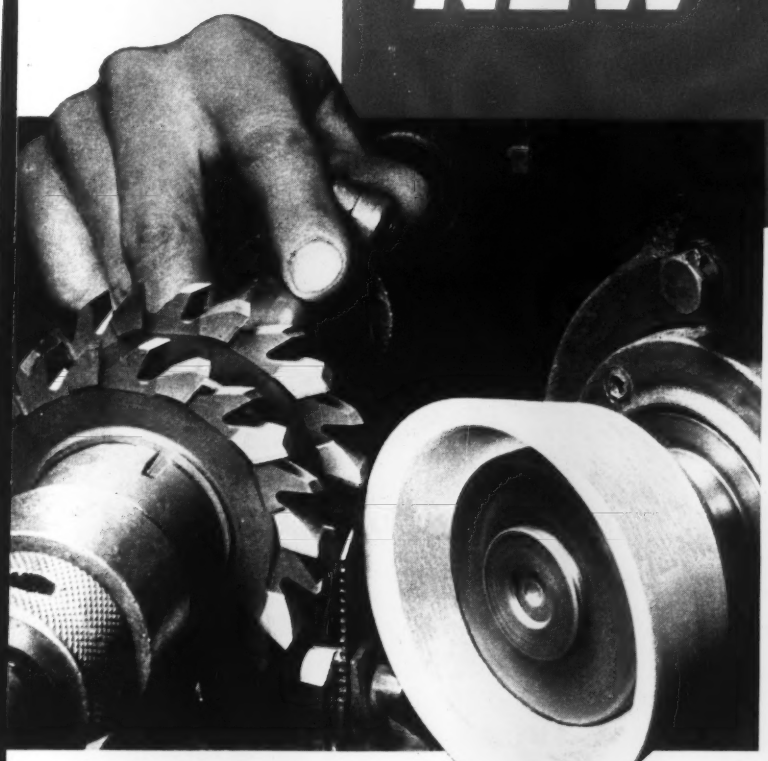
T. E. Veltfort, managing director, Copper & Brass Research Association, New York, was elected chairman of the **Standards Council** of the **American Standards Association**, that city. Harold Massey, managing director, Gas Appliance Manufacturers Association, New York, was elected vice chairman.

SIMONDS ABRASIVE CO.

NEW SA Borolon®

TRADE MARK

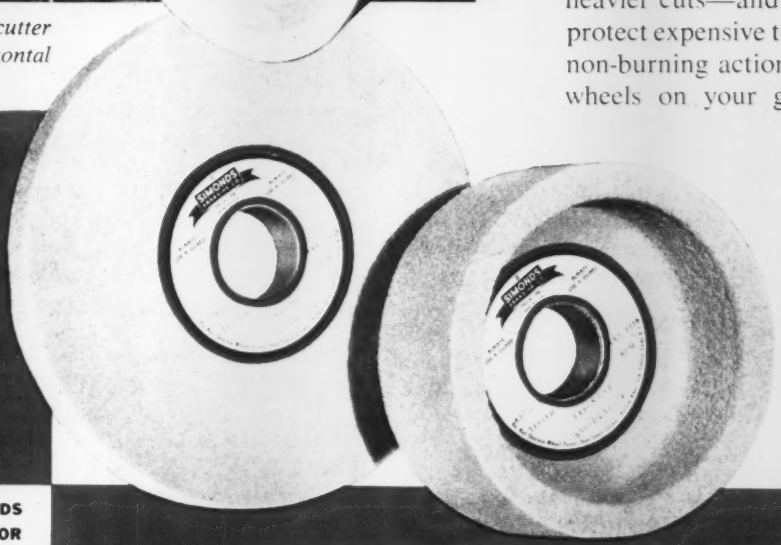
Grinding Wheels



Ideal for tool and cutter grinding and horizontal surface grinding.

COOL ACTION HELPS TOOL STEELS HOLD THEIR TEMPER

SA Borolon is a unique and radically different aluminum oxide abrasive. Cutting particles are of single, uncrushed crystal formation for greater stress-free cutting edges. This is why these wheels give faster grinding with heavier cuts—and, at the same time, protect expensive tool steels with safe, non-burning action. Use SA Borolon wheels on your grinders.



Send for bulletin ESA 272 for details plus grain and grade specifications.

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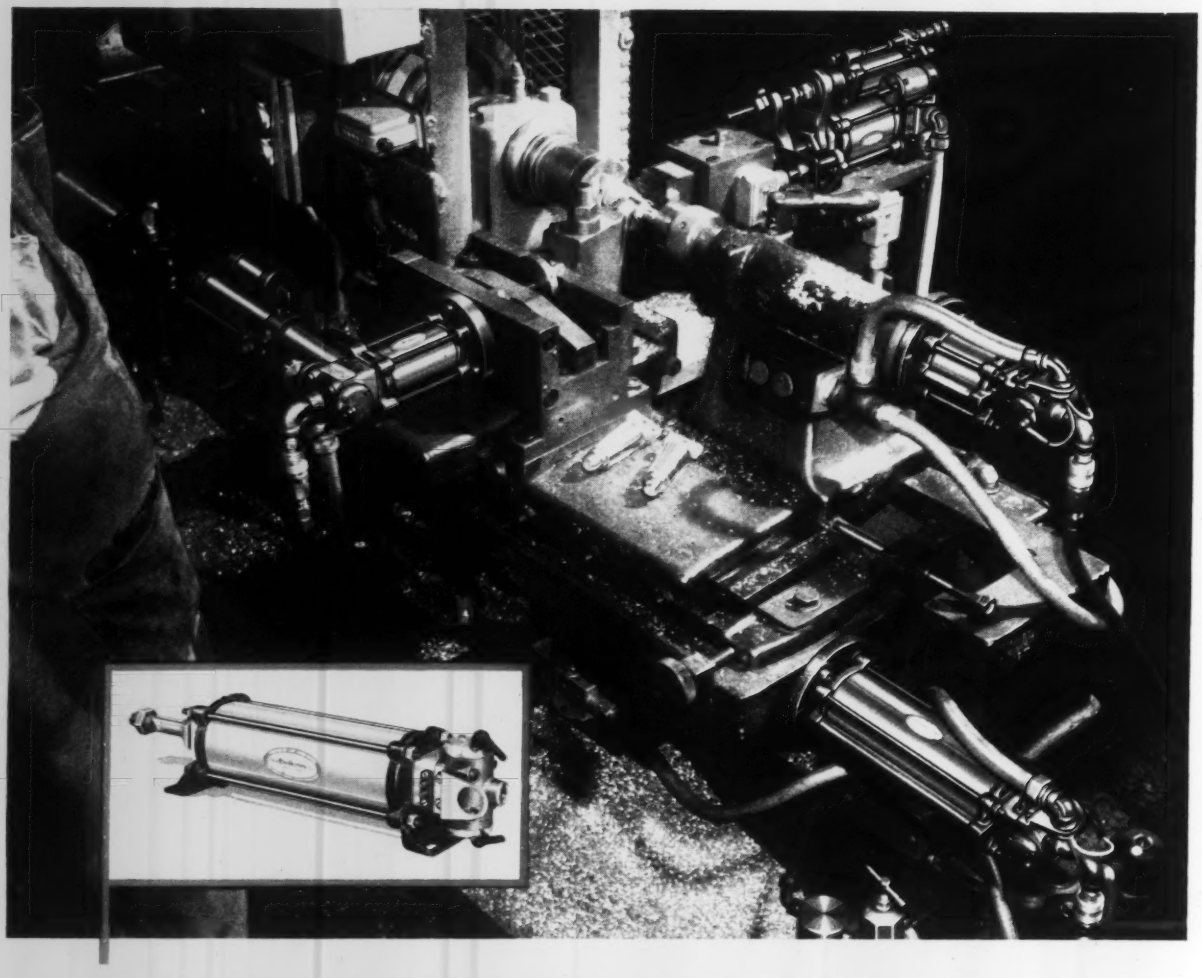


THE BELLOWS AIR MOTOR WITH ITS BUILT-IN ELECTRIC VALVE OFFERS NEW WAYS TO TRIM COSTS IN MANY VARIED OPERATIONS

In every industry you will find this unique air cylinder sparking cost reduction ideas and delivering that cost reduction in hundreds of different ways . . . from packing gardenias to drilling holes; from sorting conveyor traffic to lifting hospital beds; from feeding turrets to spinning rivets. The Bellows Air Motor puts "practical" automation within the reach of every plant.

Here's a typical example:

Hays Mfg. Co., Erie, Pa.: Chief Engineer Henry Schneider working with Frank Moore, Bellows Field Engineer, designed conversion (shown above) of a mechanically driven standard machine for turning tapered brass valve plugs, to a completely automatic air-powered operation. The application of the Bellows units was made in Hays' toolroom. Now, two men at two converted machines turn out more production than was previously obtained from four machines and four operators. Also, the quality of the finish on the plugs produced on the Bellows equipped machines eliminates 50% of the lapping time required by the old machining method.

What can it do for you? It can provide an inexpensive, easily controlled power source to perform almost any push, pull, lift or turn motion. It can make such standard machines as drill presses, lathes, millers, grinders fully automatic. It can be the heart of shop built, low cost, special purpose machines. *It can give you a fresh, new approach to the problem of cutting costs.*

Your Bellows Field Engineer (listed in the phone book under The Bellows Co.) will be glad to discuss possible applications with you. Or write The Bellows Co., Dept. ST 158, Akron 3, Ohio, for copies of Bulletins ML-3 and BM-25. In Canada, address Bellows Pneumatic Devices of Canada, Ltd., Toronto 18.

The Bellows Co.

DIVISION INTERNATIONAL BASIC ECONOMY CORPORATION

AKRON 9, OHIO

9798

Technical Outlook

NEW METAL POWDERS— Intricate sintered compacts with properties comparable to machine-wrought parts can be produced from a line of iron and steel powders called Steelmets, says P. R. Mallory & Co. Inc., Indianapolis. The powders include a 98 per cent iron alloy that can be carburized and heat treated; a high nickel, ferrous alloy that can be carburized and heat treated; an alloy equivalent to wrought 302 stainless; and a copper containing, ferrous alloy that can be precipitation hardened to 90,000 psi.

FLUOROSCOPY BRINGS SAVINGS— Chance Vought Aircraft, Dallas, is using fluoroscopy to check for flaws in aluminum and magnesium castings. A cost study of four castings, using a high intensity fluoroscope, developed by Naval Ordnance Laboratory, White Oak, Md., revealed an average saving of 85 per cent over x-ray. In some areas of inspection, such as stainless brazed assemblies, fluoroscopy is superior to x-ray.

REMOTE EYE— Television is becoming an important control tool for atomic energy operations, says General Electric Co. At its Idaho Falls, Idaho, facility, GE is using a three-dimensional color system for remote servicing of reactors used in the development of a nuclear aircraft propulsion system. At the Hanford atomic plant, Richland, Wash., television is used to examine the rear face of an operating nuclear reactor. At the Vallecitos Atomic Laboratory, Pleasanton, Calif., a television system is used to read instruments inside a reactor enclosure.

MISSILE SHELL CHEM-MILLED— U. S. Chemical Milling Corp., Manhattan Beach, Calif., is chemically milling 3 x 25 ft titanium panels that will become the shell of a long range ballistic missile. The panels are extruded, then stretch formed into an arc. I-section stiffeners and interlocking members are extruded in the panel. (Eight panels are interlocked to form the final shell.) The formed panels are chemically milled to reduce weight (more than 10 lb are removed from each panel). Bulkhead rings, which are extruded in a channel section, also are chemically milled to remove weight after they have been rolled into rings.

TUNGSTEN STEEL UPGRADED— The Bureau of Standards has developed a direct photometric method to determine minute quantities of tungsten in steel. It provides the accurate quantitative analysis needed to control the manufacturing process.

STANDARDS FOR PUMPS— Tentative standards for centrifugal pump design may bring savings of $7 million annually to the chemical industry, says the Manufacturing Chemists' Association. The standards were formulated by an industry committee working with the American Standards Association.

ALLOY FOR HEATING ELEMENTS— Hoskins Mfg. Co., Detroit, has developed an iron-chromium-aluminum alloy for moderately high temperature, resistance heating applications. Known as Alloy 835, the material has improved ductility and low growth at continuous operating temperatures up to 2250° F, says the manufacturer.

GOOD NEWS FOR STEEL MILLS— Phenol may not be the polluting agent that steel mills think it is. Thousands of dollars have been spent to treat the coke oven byproduct before releasing it into public streams. But a four-year study of the Mahoning and Beaver Rivers by Youngstown Sheet & Tube Co. and Republic Steel Corp., Youngstown, indicates there is no relationship between the amounts of phenol in the streams and the taste and odor of the water. Other, easily corrected wastes are the culprits, explain the two firms.

Metalworking Outlook—Page 29 Market Outlook—Page 99

New uses have been stimulated by the rapid advance in metallurgy. You can get the most out of these castings by examining the factors that govern their selection. This article is based in part on the Engineered Castings Seminar presented by the Foundry Dept. of General Electric Co.

Ferrous Castings

Property	Gray Iron
Tensile strength psi	20,000-60,000+
Yield strength psi	Essentially same as tensile
Compressive strength psi	70,000-200,000
Ductility (% elongation in 2 in.)	Less than 1
Machinability	Good
Damping Capacity	About ten times that of steel
Wear Resistance (lubricated sliding friction)	Excellent
Abrasive Wear	Poor
Suitability as bearing material	Poor to excellent
Weldability	With special precautions
Impact Resistance (ft-lb)	Up to 5
Stiffness (modulus of elasticity)	12 million-18 million psi

Ferrous Castings Stretch Your Dollars

YOU can reduce production costs substantially, gain design versatility, and boost the mechanical properties of your products through the wise selection of ferrous castings.

Available materials include a number of irons (gray, white, ductile, standard malleable, and pearlitic malleable) and a wide range of steels. Improvements in each have expanded their range of usefulness. It's estimated that 95 per cent of the castings made last year were of the ferrous type.

Their popularity stems from a considerable list of advantages:

- Size, shape, and intricacy are practically unlimited. The casting may be a buckle for a baby's shoe or a 200-ton part for a forging press.
- Parts are made close to final contours. Many costly machine shop operations are reduced or eliminated, including cam milling, die sinking, planing, boring, profiling, and contouring.
- Compound curves difficult to produce by other methods are easy to cast. Curves, angles, and other streamlining often improve casting procedures and their properties. Complex curved surfaces, inside and out, and varying wall thicknesses are everyday production items.
- Casting is a weight saving process because it puts metal exactly where it is needed. There is no directionality of properties; cast metal is equally strong in all directions.
- Casting is the only way that some alloys can be formed into useful shapes.

Some tips on selection of castings follow.

Offer Wide Range of Properties

Ductile Iron	Standard Malleable Iron	Pearlitic Malleable Iron	Carbon and Low Alloy Steel
60,000-160,000 +	50,000-60,000	65,000-120,000 +	60,000-250,000 +
40,000-105,000	32,000-40,000	45,000-100,000	30,000-225,000
1 to 1.2 times yield strength	About same as tensile	About same as tensile	60,000-250,000
1.0-26.0	10-30	2-12	5-35
Good	Good	Good	Less than other ferrous alloys
Between gray iron and mild steel	Between gray iron and mild steel	Between gray iron and mild steel	
Good to excellent	Good	Excellent	Good, improved by heat treatment
Good	Good	Good	Excellent
Poor to excellent	Poor	Poor to excellent	Inferior to gray iron
With special precautions	With special precautions	With special precautions	With ease up to 0.35% C
Comparable to malleable	16.5	5 to 6	Up to 65
22 million-25 million psi	25 million psi	25 million psi	30 million psi

Gray Iron Castings

Combine Economy with Design Versatility . . .

Also offer high compressive strength, good machinability, excellent wear resistance, excellent damping capacity

LOW COST and a wide range of mechanical properties make this metal the choice for nearly 80 per cent of industry's casting needs. Deliveries are good because the manufacturing cycle is short and heat treating is not required.

Strength—These irons are usually classified according to their ultimate tensile strength. Even a relatively low tensile grade will have a usable compressive strength equal to that of cast steel with a tensile of 100,000 psi. Where parts are primarily in compression, gray iron is a good choice, as in bases, die blocks, and saddles.

Its ability to absorb vibration and reduce noise (damping capacity) is a major reason for its use in machine tool bases. Designers know that the effective strength of a vibrating part may be much greater if it's made with a material of high damping capacity and only fair strength. A much stronger material of low damping capacity allows vibrations to build up to a dangerous intensity.

The wear resistance of gray iron machine parts varies from good to excellent and is superior to standard malleable iron and unhardened cast steel. This property is due to the matrix which is similar to that of rail steel, except for the presence of graphite flakes that act as oil reservoirs.

Machinability — The range is from less than 50 to over 125 per cent of that of a free-cutting grade of screw machine steel.

The designer has more latitude than he does with some of the other ferrous alloys.

The material can be cast into thin sections and intricate shapes. It has better corrosion resistance than other general ferrous types. The rust that forms on gray iron castings offers fairly good protec-

tion to atmospheric and soil corrosion, to some acids, and to alkalis. Many cast iron water mains have been in service over 100 years.

Endurance—Below its endurance limit, a metal will withstand an infinitely large number of completely reversed stress cycles. The endurance limit of a ferrous casting is about half its tensile strength. In contrast to other metals, notches have only a minor influence on the endurance limit of gray iron. This lack of notch sensitivity is an outstanding characteristic.

Ductility—Plastic elongation is used as an index of ductility. While this material is not usually thought of as having ductility, its elongation ranges from 0.2 to about 1 per cent. The lack of ductility causes castings to crack under severe overloads. (Castings made of other ferrous metals distort so that stresses are equalized, and the part can remain in service.) However, when selecting a material for a part, don't forget that in many cases its usefulness is limited by allowable deflection. Exceeding this limit is just as bad as exceeding the tensile limit.

Heat Treating—Gray iron can be uniformly softened to increase machinability or hardened to increase hardness and wear resistance. Gear blanks are often first heat treated for free machining and later flame hardened to improve wear resistance of the teeth.

Composition—Carbon and silicon contents are varied to produce gray irons with tensile strengths of 20,000 to 50,000 psi. The changes affect the amount of free carbon (flake graphite) which, in turn, affects many of the properties of the casting.

Generally, these changes are brought about as the amount of free carbon is decreased:

1. Hardness and strength are increased.
2. Stiffness (modulus of elasticity) increases.
3. Impact resistance increases.
4. Notch sensitivity increases.
5. Damping capacity decreases.
6. Machinability decreases.
7. The castings are more difficult to make and cost more.

Alloys—Tensile strengths up to 60,000 psi and higher can be obtained by adding alloys. They are also used to obtain special properties. (About 5 to 20 per cent of gray iron castings contain one or more alloys.)

- Chromium is used to increase strength, hardness, and resistance to heat, wear, and corrosion.
- Copper increases resistance to air and atmospheric corrosion and, with chromium, to heat and corrosion.
- Molybdenum (alone, or in combination with chromium or nickel) is used to increase tensile strength and impact resistance. Elevated temperature strength is improved.
- Nickel increases machinability and can be used (with adjustments in carbon and silicon) to increase strength, hardness, and resilience.
- Inoculation (the addition of small amounts of elements to molten iron in the ladle) results in increased strength and toughness, improved machinability, and the ability to make castings of varying section size machinable on the edges and strong in heavy sections.

White Iron—Adjusting the composition of cast iron will cause the entire structure to be white—nearly all the carbon will be in the form of iron carbide, an extremely hard substance. Along with high hardness, these castings have high compressive strengths. This combination resists wear under high pressure. The castings are almost impossible to machine.

White irons are also made to resist scaling and creep at elevated temperatures, and chemically passive to resist some kinds of corrosive attack.

The foundryman uses chills to produce gray iron castings with localized areas of wear-resistance white iron.

Ductile Iron Castings

Combine Strength with High Ductility . . .

Also offer good machinability, good impact resistance, good damping capacity, good stiffness

LESS THAN TEN years ago ductile (or nodular) iron was unknown to industry. Now it is made by about 125 foundries, and production (about 125,000 tons in 1957) has been increasing at the rate of 60 per cent a year.

Big Advantage—This iron combines the processing advantages of gray iron—good fluidity, castability, ready machinability — with many of the engineering advantages of steel—good strength, toughness, wear resistance, and good ductility. There are no size limitations and intricate shapes can be cast.

Types—These irons fall in three general classes:

1. Ferritic types, which have high ductility, excellent machinability, and a moderate yield strength.
2. Pearlitic types, which have good yield strength and machinability, but moderate ductility. They show excellent response to flame or induction hardening.
3. Heat treated (normalized, or quenched and tempered) types which have exceptionally high tensile and yield strengths while retaining ductility.

Properties—Generally, machinability is equal to or better than that of gray iron of similar hardness levels.

The iron is elastic and develops proportionality of stress to strain up to the yield point. Its rigidity is higher than that of ordinary gray irons, which do not have a true modulus of elasticity. The property is important in the design of many engineering components, such as crankshafts for reciprocating engines or compressors.

Wear resistance, both in the lubricated and unlubricated conditions is equal to that of gray iron of comparable matrix microstructure.

Because of its strength, the material is used to withstand pressures in pipes, cylinders, and compressor heads.

These castings are used to withstand moderate impact or shock in gears, pulleys, and transmission cases.

When wear resistance is of primary importance, the iron is used in brakewheels, plowshares, and packing rings.

Recent reports indicate that it can be welded to itself and to carbon steel, stainless steel, and nickel by the metallic arc process —the techniques are the same as those used for good grades of gray iron. It can also be brazed, gas welded, and overlay welded.

Evaluation—P. W. Green, process metallurgist, General Electric Co., says that the range of physical properties of ductile and pearlitic malleable irons are comparable, with a small edge in some characteristics in favor of ductile. He continues: "In heavier section castings, ductile will normally offer the lowest cost solution to your casting needs. In lighter castings, (wall sections under 3/4 in.) malleable or pearlitic malleable will normally be more economical."

Standard Malleable Castings

Combine Machinability with Toughness . . .

Also offer high ductility, good impact resistance, good stiffness, design versatility

ABOUT half the standard malleable iron produced in this country each year goes into some of the toughest jobs that automotive designers have created.

The high toughness and ductility of the material, combined with its excellent machinability and good casting properties, are responsible for its selection by this exacting and cost-conscious group of designers.

Malleable normally is made in castings weighing from a few grams to 100 lb, although it can be used in parts weighing up to 1000 lb. Section thicknesses range from 1/16 to 4 in.

The Process—These castings are formed by annealing white iron for 18 to 72 hours or longer. As a significant byproduct, the annealing insures that parts are free from casting stresses and have uniform structure and properties. Because the castings are free from stresses, distortion during machining is not a problem.

The castings can be die straightened in hydraulic presses, mechanical presses, or drop hammers when you need close tolerances and want to hold machining to a minimum. Shear knives can be built into the straightening dies so that gates can be removed at the same time the castings are straightened.

Advantages — Castings removed from the dies have close tolerances and are often ready for use—a cost-saving advantage resulting from the material's ability to be straightened.

Unlike most cast material, malleable can be further formed by press or coining operations that greatly reduce machining costs. Often holes can be punched, eliminating expensive drilling.

It is generally agreed that the machinability of this iron (as compared by tool life or cutting speed) is better than that of other ferrous materials of equal tensile strength.

The material has high impact resistance and is used when parts must resist shock loading.

It has excellent corrosion resistance in many applications. A skin a few thousandths of an inch is developed during annealing which has high resistance to corrosive media. If attacked, it develops a tightly adherent surface product which resists further penetration.

Tests at the Naval Research Laboratory indicate that the irons are inherently notch ductile and suitable for low temperature applications. Compared with low and medium carbon steels, standard malleable irons retain notch ductility to lower temperatures; pearlitic malleable irons can be made with notch ductility properties comparable to those of steels.

Pearlitic Malleable Castings

Combine Strength with Wear Resistance . . .

Also offer excellent hardenability, good stiffness, good machinability, excellent bearing properties

ONLY in the last five years has this iron made an impact on the marketplace. Sales have shown a fourfold increase during the period. Shipments in 1957 were about 160,000 tons.

Reasons for Growth—The material has higher strength, hardness, and abrasion resistance than standard malleable. But these properties are gained at the expense of ductility, shock resistance, and machinability.

The irons can be selectively sur-

face hardened either by induction or flame heating methods. Sections up to ¾ in. can be hardened through in oil, so that subsequent drawing will produce uniform hardness and strength.

Although these grades do not have the machinability of the standard grades, they are 20 to 30 per cent more machinable than steel bar stock or forgings of the same Brinell hardness, says General Electric. And tool life is better.

The harder of these irons show excellent resistance to wear, making it possible for users to eliminate bushings in moving parts (as in rocker arms of overhead valve engines). The endurance limit depends on hardness and ranges from 30,000 to 50,000 psi.

Steel Castings

Combine High Strength with Easy Weldability . . .

Also offer high tensile strength, high toughness, high ductility, high stiffness

THESE CASTINGS have nearly all of the advantages that make wrought steel outstanding for construction. They have some advantages obtainable in no other way, but certain disadvantages.

A combination of great strength, ductility, and toughness distinguishes steel from other ferrous metals. The castings can be machined as easily as wrought steel and are well suited for use in welded assemblies with other castings and wrought parts.

A Distinction—The castings have uniform properties, regardless of the direction in which they are tested. Parts which are wrought are tough and strong in the direction of working but weak and more brittle in the transverse direction. Cast steel is better suited to uses where directionality of properties might prove harmful.

These castings fall into three classes—carbon, low alloy, and high alloy.

Low Carbon — These castings have carbon contents up to 0.20 per cent. They find extensive use in the electrical industry because of their desirable magnetic and electric properties. Melting points are high because of low carbon content. The material is used to make melting pots for lead, aluminum, and magnesium.

Low carbon varieties are the softest and most ductile of the several grades of carbon steel. They are sometimes used as-cast because their properties are little affected by heat treatment.

Low temperature properties are good down to −50° F. Large castings are often made of this material when rigidity and moderate resistance to shock are more important than high strength.

Medium Carbon—About 60 per cent of steel castings contain from 0.20 to 0.50 per cent carbon.

Conventional types of heat treatment develop excellent properties. These castings are never used as-cast because of the extent to which heat treatment improves their ductility and impact resistance.

Quenching and tempering treatments are used to improve tensile strength, yield point, ductility, impact, and endurance values.

Major uses: Railroad cars, rolling mills, power shovels, road building equipment, and ordnance equipment.

High Carbon—These steels have higher hardness and strength than medium carbon types. Their major use is in tools where wear and abrasion resistance are needed. They're also used in several kinds of rolling mill equipment, including rolls, tube piercing points, forming and shaping dies and tools.

Low Alloys—Steels with alloy contents up to 8 per cent respond better to heat treatment than the carbon type. You can get high mechanical properties without the severe heat treatment required by carbon grades.

Major alloy groups used to increase hardenability (in increasing order of their effectiveness) are manganese - molybdenum, nickel-chromium-molybdenum, and manganese - nickel-chromium-molybdenum.

These steels provide improved resistance to impact at normal and low temperatures and are used in applications similar to the medium carbon types when higher properties are needed.

The castings will withstand higher loads because they develop uniform properties throughout their sections. Uses in transportation (automobiles, railroad cars, trucks, and aircraft) are important.

Low alloy steels with strengths over 250,000 psi are used in aircraft and missiles. The hardness of these alloys also makes them useful in wear-resistant applications, such as in mining and taconite manufacture.

High Alloys — Superior corrosion, heat, or wear resistance are provided by steels with alloy content over 8 per cent.

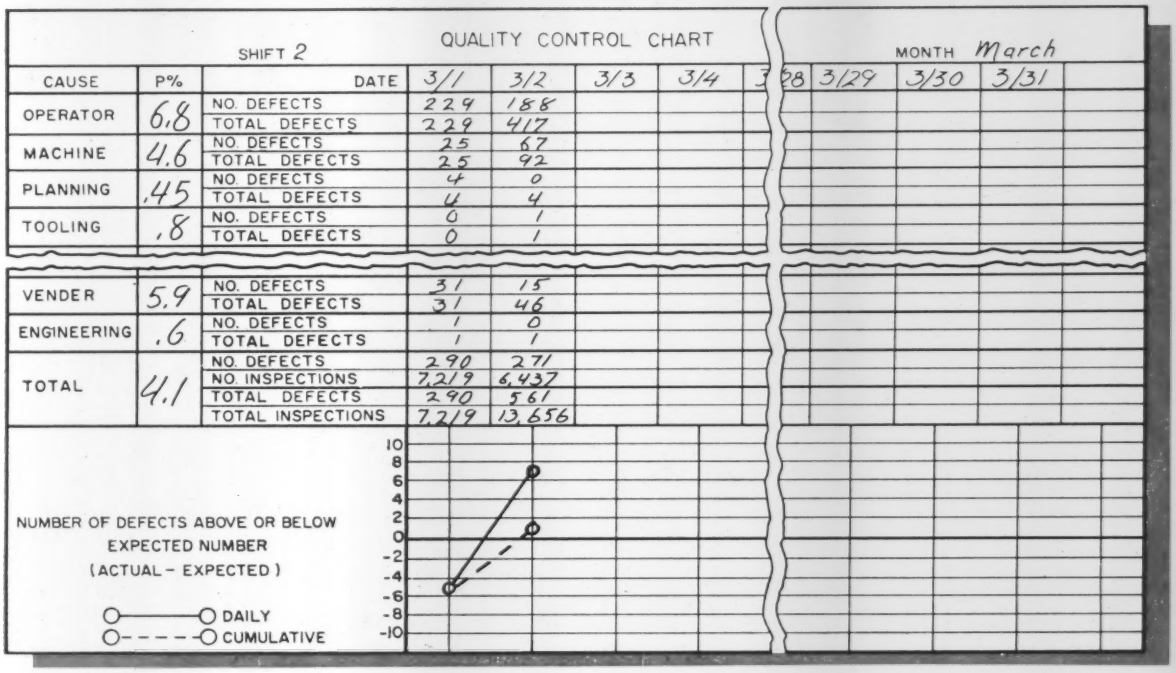
There are 16 standard grades of corrosion resistant alloys and 14 standard grades of heat resistant alloys.

The alloys are composed largely of nickel, chromium, and iron. They are used to resist oxidation and other type of high temperature corrosion and to withstand the corrosive action of acids and alkalis at normal and elevated temperatures.

Heat resisting alloys are used in furnace parts, stills, and cracking units. The major use of corrosion resistant alloys is in oil refineries and the chemical industry.

Outstanding wear resistance (impact) is provided by austenitic manganese steel. It is used in parts for the mining industry that must withstand impact on rock. As peening action increases, the part hardens on the surface.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*



QUALITY CONTROL CHART

SHIFT 2 MONTH March

CAUSE	P%	DATE	3/1	3/2	3/3	3/4	3/28	3/29	3/30	3/31
OPERATOR	6.8	NO. DEFECTS	229	188						
		TOTAL DEFECTS	229	417						
MACHINE	4.6	NO. DEFECTS	25	67						
		TOTAL DEFECTS	25	92						
PLANNING	.45	NO. DEFECTS	4	0						
		TOTAL DEFECTS	4	4						
TOOLING	.8	NO. DEFECTS	0	1						
		TOTAL DEFECTS	0	1						
VENDER	5.9	NO. DEFECTS	31	15						
		TOTAL DEFECTS	31	46						
ENGINEERING	.6	NO. DEFECTS	1	0						
		TOTAL DEFECTS	1	1						
TOTAL	4.1	NO. DEFECTS	290	271						
		NO. INSPECTIONS	7,219	6,437						
		TOTAL DEFECTS	290	561						
		TOTAL INSPECTIONS	7,219	13,656						

Daily records like this one keep track of defects. Expected number is based on past performance. Statistical methods are used to determine upper limit for defects

Job Shop Quality Control

Small unit at Westinghouse is getting good results even though it has runs of less than 20 on most of its jobs. As in the large plant, the keeping of accurate records is vital

By FRANK CAPLAN JR.
Atomic Fuel Dept.
Westinghouse Electric Corp.
Pittsburgh

YOU don't need volume to use statistical techniques. They work just as well in a job shop.

Here's how they're used to control quality of parts made in the Atomic Fuel Dept., Westinghouse Electric Corp., Pittsburgh.

Quantity—The bulk of jobs produced in our development shop are in lots less than 20—from small gears to large forgings and castings. Parts are made by machining and sheet metal fabrication.

Attitude Important—We first established two points with shop personnel: 1. Operators produce inspection points, not parts. 2. There would be no blame for defects.

The first point reduces all machining operations to a common denominator. It doesn't matter whether the operator drills, deburrs, or counterbores—comparisons of quality are unbiased and can establish capabilities of man, machine, and method.

Records—Each inspector carries a form to record shift number, machine, points inspected during the shift, and the number of deviations found. It is turned in to the foreman at the end of a shift.

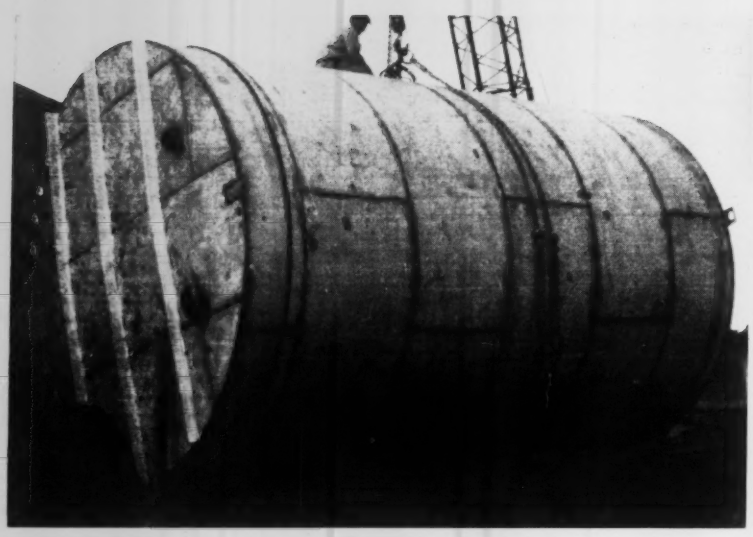
The data on each sheet are tabulated the following morning on large floor charts. Each carries information for a two-week period. Defects are listed for each machine or rework operation.

Process averages are calculated from part history. Comparisons show whether current results are out of control. Plotted points (like those in the illustration) which are above average are made in red; those which are below, in green.

Management Tool—Quality control men post the results of each chart in the general foreman's office. Each record in turn is posted in the superintendent's office.

The charts quickly show the performance of each job and each foreman. Each is required to explain quality deviations daily. A result of the system is an improvement in the foreman's interest in quality. Inspectors are instructed to notify the foreman of defects immediately. He can investigate the cause at once rather than wait for deviations to be posted.

Cautions—There was some distrust at first, but the smooth working of the system has overcome all doubts.



Stainless tank (left) holds 25,000 gallons of nitric acid. Flux is a new type which compensates for chromium otherwise lost through oxidation. Operator (right) uses semiautomatic welder to join inside reinforcing band to shell of smaller tank

Submerged Arc Cuts Weld Cost

Stainless tank fabricator prefers semiautomatic method to coated electrode. Advantages cited: Greater speed, improved quality and appearance, deeper penetration

WELDERS of stainless sheets and plates are turning more often to the submerged arc method, says Herbert Lind, superintendent, Norwalk Tank Co., South Norwalk, Conn.

It is particularly well suited for fabricating chemical and processing tanks. Norwalk no longer uses manual welding with rods.

Procedure—Here's how a nitric acid tank is made. The one illustrated is 14 ft in diameter, 22 ft long, and holds 25,000 gallons. It is made of Type 304 stainless steel, including the fittings. Top plates are 3/16 in. thick; the shell, ¼ in.; the bottom, ⅜ in.

Quality—All welds must have 100 per cent penetration. A single pass is made from either side. Buttwelds have square edges without preparation. Welds are made in the flat.

Each section (there are two) is roll formed after welding and joined with a longitudinal weld. The two pieces are joined with a circumferential weld while in position.

Equipment — Girth seams are made by a semiautomatic Squirt welder mounted on a torch-cutting machine. Turning the tank controls arc speed at 12 to 15 ipm.

Manual tack welding precedes finishing. A snug fitup is important in stainless because of a higher coefficient of expansion.

The electrode is bare 18-8 wire (5/64 in.). An agglomerated flux (Lincoln Electric ST-100) is deposited continuously to eliminate oxidation, arc glare, and spatter. The composition has enough ferrochrome to compensate for chromium lost from the electrode wire in the arc. It does not add carbon to the weld metal.

Other Examples—Stainless vessels 2 ft in diameter by 6 ft long are made by Norwalk for a southern chemical company. Procedures are similar to those for the larger tanks.

The job is set up for straight line production. Mechanical handling moves the parts through the sequence. Compared with hand welding, the saving in labor is 67 per cent.

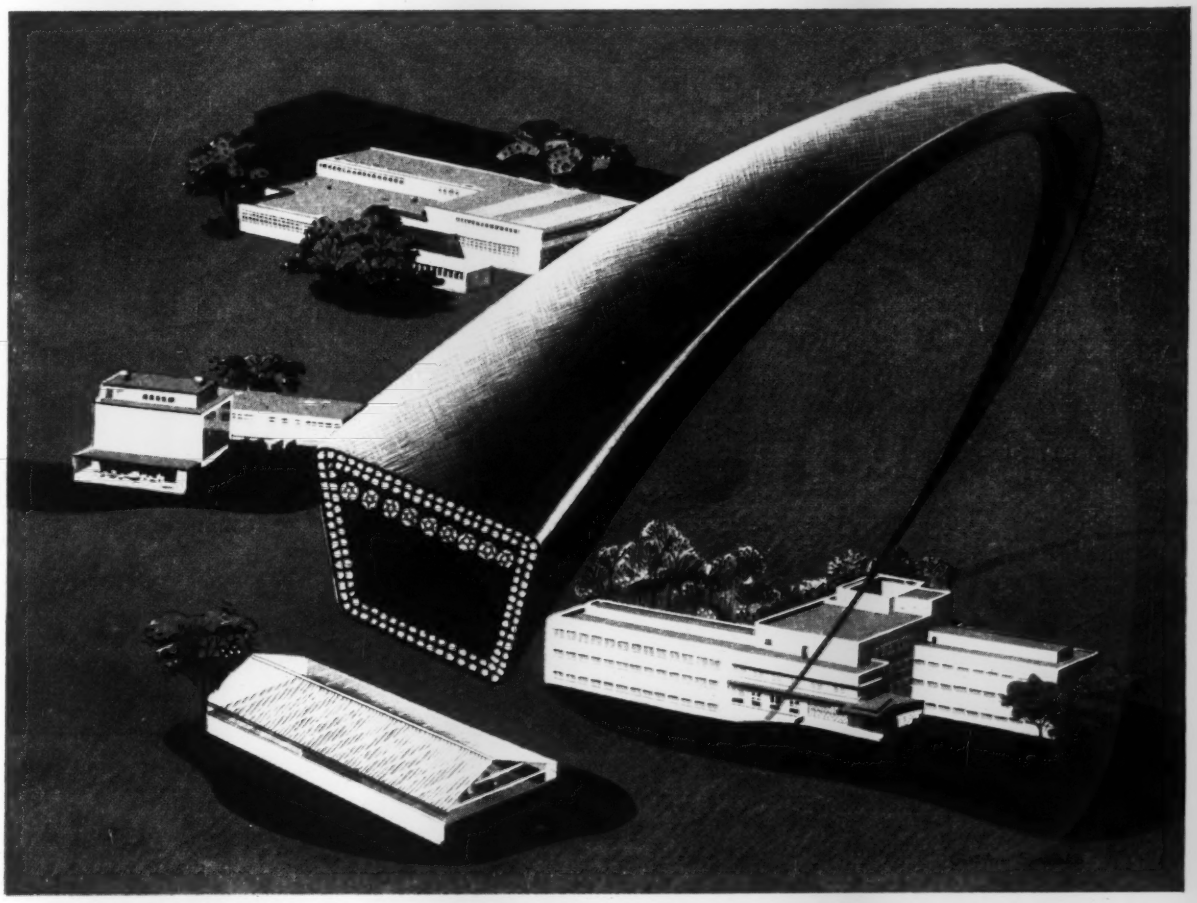
Complete Procedure—The tanks have shells, bottoms, and reinforcing banks made of ¼-in. plates.

The longitudinal seam requires 100 per cent penetration; after tacking, it is welded by hand with a semiautomatic Squirt gun. Flux backup is carried in a small trough inside the shell. Travel speed is about 15 ipm.

The bottom plate and top band are first tack welded. The tank is turned on live rolls under the submerged arc gun at speeds up to 25 ipm. Flux over the bead falls into a bin for separation and re-use.

Handling equipment has eliminated cranes and hoists. Cleaning and grinding of welds are at a minimum.

UNITENSION V-BELTS



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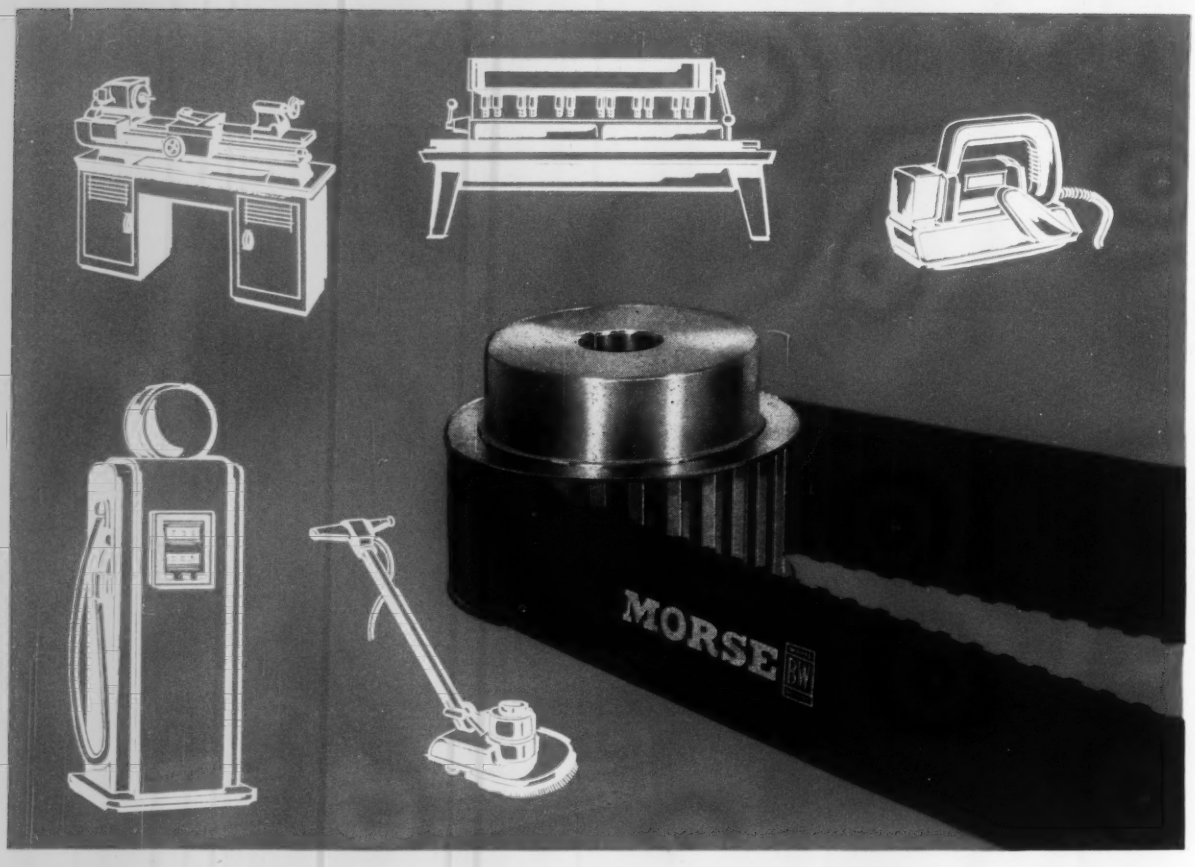

New! . . . from Morse Chain

Morse "Timing"® Belts

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EXCLUSIVE!

Only Morse offers all 4 of these basic power transmission drives: Roller Chain, Silent Chain, Hy-Vo Drives, and "Timing" Belts. Your Morse distributor has no ax to grind in favor of one or two types of drives—he gives you a truly impartial analysis of your power transmission problems. Call him today!

Here's why *Morse* "Timing" Belts are important to *you:* For the first time, you can get these versatile, job-proved drives from a specialist with years of experience in every phase of mechanical power transmission!

Along with seasoned engineering know-how, Morse gives you the convenience of a complete line to choose from: 0-16,000 FPM; 1/1000 HP to 1,000 HP; in stock or made-to-order drives.

Whether or not you already use timing belts, it will pay you to get all the facts on *Morse* "Timing" Belts from your local Morse distributor. You'll find him listed in the Yellow Pages under "Power Transmission," or write: *MORSE CHAIN COMPANY, DEPT. 2-18, ITHACA, NEW YORK. Export Sales: Borg-Warner International, Chicago 3, Illinois.*

IN POWER TRANSMISSION
THE TOUGH JOBS COME TO

MORSE MORSE B-W

*Trademark

Status of Vacuum Melting in U. S.

		Vacuum Degassing	Induction Vacuum Melting	Consumable Electrode Arc Vacuum Melting
Number of sources, 1957		2	64	31
Predicted, 1958		**6**	**75**	**44**
Largest ingot or casting, lb, 1957		350,000	3,000	12,000
Predicted, 1958		**400,000**	**5,000**	**18,000**
Annual ingot capacity, lb, 1957		50,000,000	21,000,000	111,000,000
Predicted, 1958		**200,000,000**	**27,000,000**	**154,000,000**
Melting rate, tons per hr		5	0.25	1
Range of gas contents in product, ppm:				
Killed low alloy steel (0.25 carbon)	Hydrogen	1-4	<1	<1-2
	Oxygen	10-100	5-15	5-25
	Nitrogen	25-100	5-50	10-100
Stainless or high-temperature alloy (Fe, Ni, or Co base)	Hydrogen	<1-5	<1-2	<1-2
	Oxygen	10-100	5-125	10-100
	Nitrogen	50-300	20-200	20-200

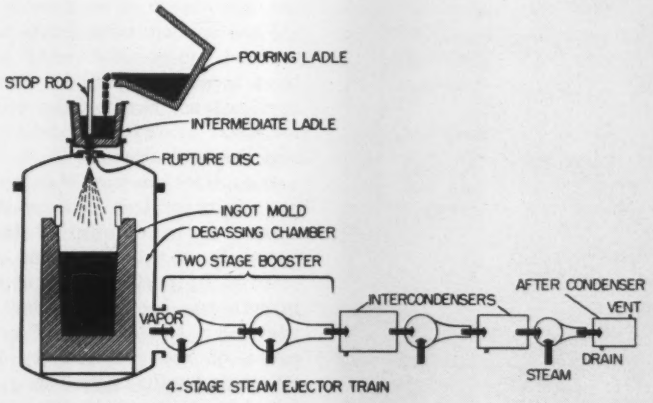
Source: C. T. Evans Jr., Universal-Cyclops Steel Corp.

A Critique of Vacuum Methods

There's a time and place for each technique—stream degassing, induction melting, consumable electrode arc. Degassing is enjoying biggest boom

ELECTRIC steelmakers are taking a hard look at vacuum melting. While they're using vacuum methods to make extra clean steel, you can still get an argument on when to use vacuum, when not to, and which method to adopt.

Some of the questions were aired at the recent Electric Furnace Steel Conference of the American Institute of Mining, Metallurgical & Petroleum Engineers. C. T. Evans Jr., vice president, Technology & Development, Universal-Cyclops Steel Corp., Bridgeville, Pa., led off with a discussion of three processes which have achieved commercial success: 1. Vacuum degassing. 2. Induction vacuum melting. 3. Consumable electrode arc melting. Here is the gist of what he said:



Vacuum stream degassing

Vacuum Degassing—This process has been used in Germany and Russia for at least ten years, but only two production installations are operating in this country (others are under construction). The stream degassing equipment at Bethlehem Steel Co., Bethlehem, Pa., and the Duquesne (Pa.) Works of U. S. Steel Corp. is capable of handling low alloy steel ingots weighing at least 350,000 lb. There are other possible ways to degas steel, including a vacuum lifter developed in Germany that operates on a principle similar to a Silex coffeemaker.

In vacuum degassing, hydrogen comes out of the pouring stream,

More Highlights of AIME

Deoxidation Practice

Although oxygen is essential to the production of quality steel in the arc furnace, its presence in the finished casting may be harmful. It is usually found in the form of nonmetallic inclusions which reduce impact strength.

To minimize inclusions, these practices should be considered: 1. Clean furnace bottoms. 2. Low FeO content in the final slag. 3. High residual manganese. 4. Proper deoxidation. 5. A good refractory program. 6. Well adapted pouring methods.

Steels deoxidized with manganese and silicon in a ratio of 3:1 or greater yield the cleanest steels. Final deoxidation with aluminum should be followed by adding sufficient silicon to meet desired metal chemistry. A combination of deoxidizers—for instance, manganese and aluminum together—is more effective than their use singly.

—W. A. Koppi, Development & Research Div., International Nickel Co., New York, "Some Aspects of Melting Low-Temperature High-Impact Steels."

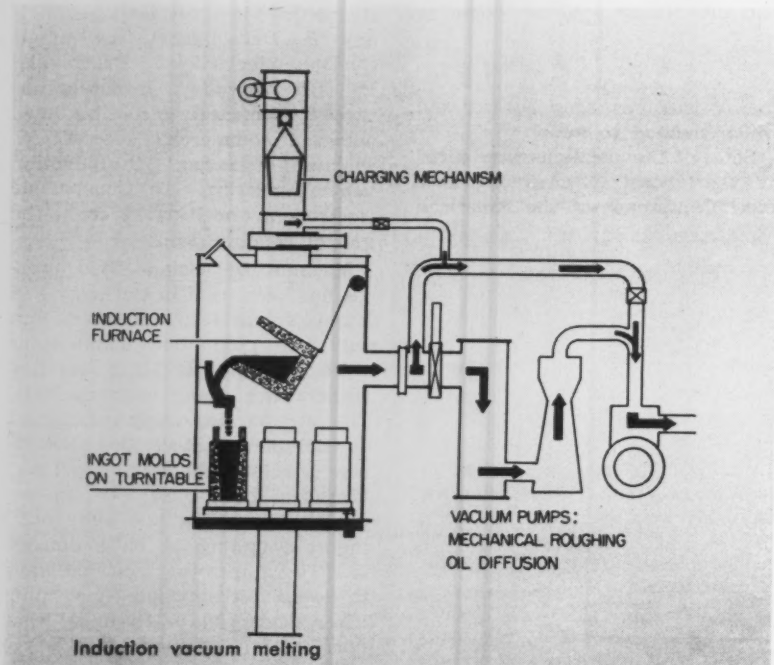
Spectrochemical Analysis

The few elements that cannot be handled by optical emission methods cost much more to analyze than all those that can. The search is on for ways to extend the limits of direct-reading analysis.

Two approaches appear most likely to increase the number of elements that can be determined: 1. Changes in the means of sample excitation. 2. Extension of the spectral range. Applied Research Laboratories has development programs in both fields.

The Quantovac is the result of a development project of the ARL group in Lausanne, Switzerland, where this instrument is now in production. It is designed to extend the useful spectral range into the far ultraviolet. The most sensitive arc lines of carbon, phosphorus, sulfur, mercury, arsenic, and selenium lie in this region. The most sensitive spark lines of antimony, germanium, mercury, aluminum, lead, gold, silicon, and bismuth are also found here. The arc lines are of greater importance because they include the most sensitive lines of carbon, phosphorus, and sulfur.

—H. W. Calkins, Applied Research Laboratories, Glendale, Calif., "The Quantovac — a Direct-Reading Instrument for the Control of Carbon, Phosphorus, Sulfur, and the Other Important Elements in Iron and Steel."



Induction vacuum melting

and final H_2 values below 1 ppm have been consistently reported. The elimination of hydrogen flaking in steam turbine and generator rotor forgings is extremely important. Vacuum degassing is attractive to operators of basic open hearth and basic electric arc furnaces because both processes produce melts high in hydrogen. Operators of acid open hearths do not feel the need so greatly.

Vacuum degassing costs are estimated by one authority at less than 1 cent per pound. For some applications, the process will pay for itself by reducing the need for long heat treatments.

Induction Vacuum Melting—The popularity of this process is indicated by the number of installations—there are at least 64 of substantial proportions. Most of the growth has been in the last three years, but the pace is off now because of reduced activity in the jet engine industry. The greatest use has been in melting nickel-base, titanium, and aluminum-

Electric Furnace Steel Conference

Monolithic Arc Furnace Roofs

Monolithic construction in center sections of arc furnace roofs has proved a practical method of reducing roof costs. Rammed or cast high temperature castable refractories offer maximum economies.

Materials installed by ramming frequently fail because of laminations. Special techniques must be used to overcome the weakness.

Casting refractories instead of ramming them saves many manhours. Use of a high speed vibrator permits placement of a castable with minimum water content. This assures maximum density and strength and optimum service life.

—J. D. McCullough, chief engineer, Babcock & Wilcox Co., New York, "Cast and Rammed Sections in Arc-Furnace Roofs."

Arc Control Analysis

The arc furnace involves continually changing conditions. The temperature, the materials being melted, and many other factors vary the parameters of the system. The control system must be designed to do the best work possible for a wide variety of conditions.

A reasonable correlation between the theoretical and actual operation of an electrode control system can be achieved. Mathematical simulation of the system is possible; it can be used for choosing components, predicting adjustments, and making modifications to the system, even before it is constructed.

—J. H. Kogen, chief development engineer, Askania Regulator Co., Chicago, "Analysis and Practical Results Obtained from a Study of Arc-Furnace Control."

Load Limiting Controls

The load on an electric furnace can be cut back in the middle of a heat. Melting time is increased, but the heat is by no means spoiled. But a rolling mill cannot be delayed once a slab has entered the mill without sacrificing the entire piece.

Electric furnaces are the No. 1 cause of power peaks. By installing a load limiting control on them we can hold the kilowatt-hour consumption to a minimum. Power peaks are controlled by forcing some into the valleys.

The power limiting controls installed for the Brackenridge — West Leachburg, Pa., plants of Allegheny Ludlum cost around $45,000. They have saved as much as $20,000 a month in reduced power costs.

—C. A. Scammon, chief electric engineer, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

hardened jet engine bucket alloys.

The process has two serious cost disadvantages: Small batches and low melting rates. Among the three production processes discussed here, its installation costs are highest. A 5000-lb furnace is probably the practical size limit.

On the credit side, the low pressures (1 to 10 microns) give carbon great deoxidizing power during melting, eliminating the need for silicon and manganese as deoxidizers. These elements are detrimental to the stress rupture properties of some alloys. However, the carbon activity can backfire and result in severe attack on the refractories, leading to inclusions of refractory particles in the ingot.

Induction vacuum melting permits the use of higher titanium and aluminum content in some alloys and gives close control over boron and zirconium content. It also prevents the formation of oxides, nitrides, and cyanonitrides in the grain boundaries that make some air-melted alloys unworkable. Precision castings made from alloys induction melted in vacuum are improved for similar reasons.

Consumable Electrode — This vacuum arc process was originally developed for materials that could not be melted in regular crucibles. An outstanding feature is the water cooled copper mold which permits solidification without mold contact. The furnace can be compared to a giant automatic welding machine, depositing an ingot in a cavity by direct discharge of a low voltage, high amperage arc.

Some 27 of these furnace installations have been made in the U. S. They're for melting titanium, zirconium, molybdenum, and other refractory and reactive metals. About three years ago, the value of the process for steel remelting was recognized, and there are now four consumable electrode shops primarily for steel remelting. Much titanium melting capacity is available for the same purpose.

Vacuums range from less than 1 to 300 microns. The vacuum is employed primarily to protect the melt from oxidation, and the process produces an exceptionally sound ingot. The pool of molten metal within the mold averages 50 per cent of ingot height, giving time for some dissociation of oxides, nitrides, and other injurious compounds. Nonmetallics and other compounds which do not dissociate can be floated to the top of the ingot, or more often they freeze out along the sides where they can be removed by conditioning.

The main deficiency of the process is that it is not self-sufficient. It requires a high quality of electrode to begin with. But it appears to have no size limitation—Universal-Cyclops has a furnace capable of making an ingot 40 in. in diameter that weighs 29,000 lb.

Experimental—An electron bombardment furnace developed by Temescal Inc. of Richmond, Calif., is attracting interest. It is a consumable electrode type with a high voltage applied to both the elec-

(*Please turn to Page* 84)

NEW HYDRAULIC SLOTTER OFFERS BOTH

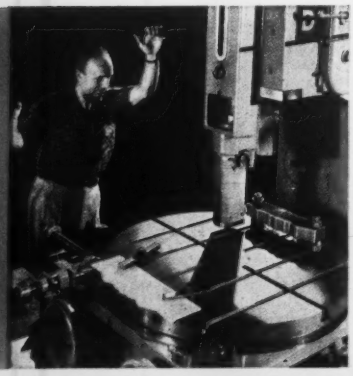
tracing and conventional slotting

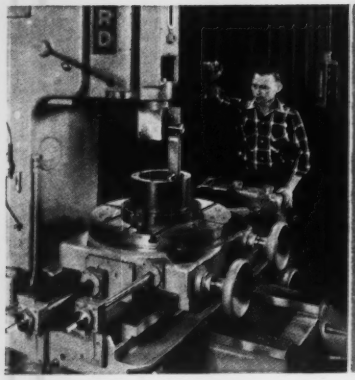
Here's a powerful new Hy-Draulic Slotter capable of doing both conventional slotting and complicated tracing work. Rotary tracing and straight work are handled by a transverse movement of the saddle. Equipped with a highly sensitive, precision-engineered Kopy-Kat Duplicator, this slotter will actually produce its own working templates from a toolroom master, or from a finished workpiece.

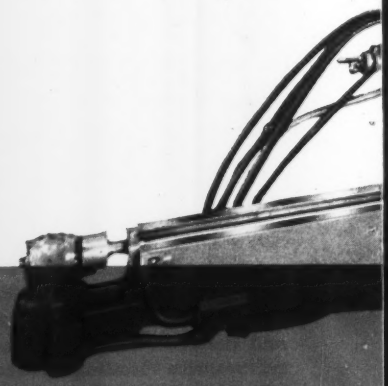
Design features of this versatile new machine include powerful fulcrum drive to the ram, hydraulic feeds and power rapid traverse in all directions, and pendant controlled cutting speed changes.

See your Rockford Machine Tool Co. representative, or write us directly, for the complete information on this new Hy-Draulic Slotter.

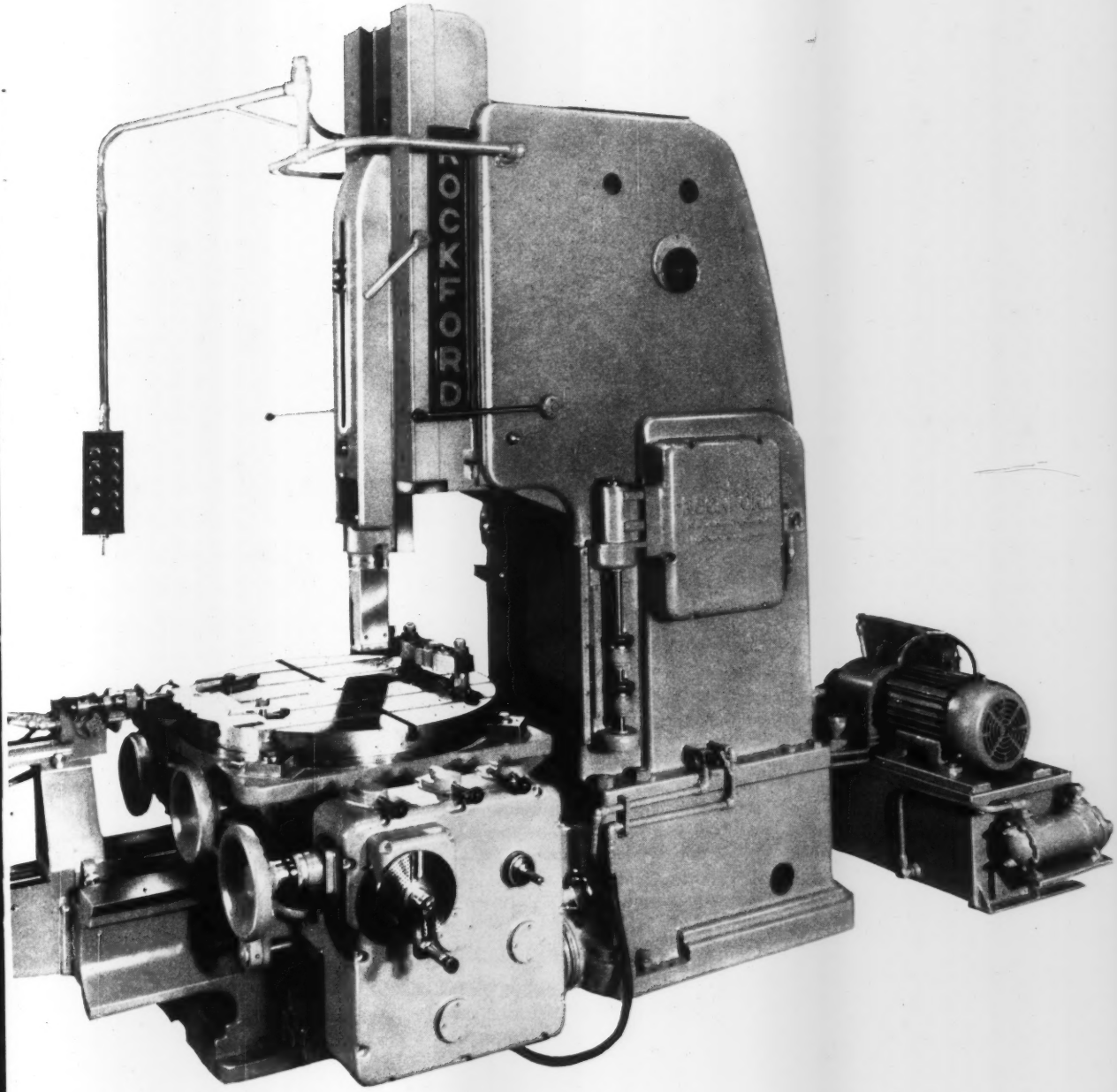
tracing







conventional slotting



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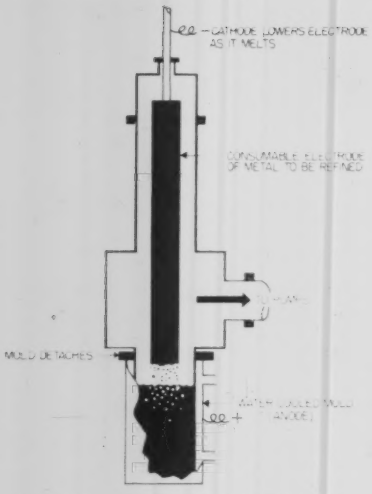
CATHODE LOWERS ELECTRODE AS IT MELTS
CONSUMABLE ELECTRODE OF METAL TO BE REFINED
MOLD OF COPPER
WATER COOLED MOLD (ANODE)

Consumable electrode arc melting

VACUUM METHODS . . .

tron source and the mold, so that a fine degree of control is possible. Continuous extraction of the ingot is feasible, but ingot diameter is limited to a few inches because of the high extreme vacuum required (about 0.1 micron).

Nonconsumable electrode arc melting has been largely superseded by the consumable process. The tungsten and carbon electrodes contaminated the melt.

You can obtain high purity with skull melting, using a shell of the material being melted as the mold, but it presents difficult control problems. Its main use may be for reclamation of titanium and zirconium scrap.

Zone and levitation melting are still laboratory processes.

Air vs. Vacuum — We'll have a better idea of how extensively vacuum processes will substitute for air melting when we know more about the benefits to be derived from gas elimination. All three major processes have excellent capabilities for reducing hydrogen, oxygen, and nitrogen, but we don't know how much of these gases must be removed to get the results we want. We also need to know more about the form in which these gases occur after different types of melting.

The vacuum melting industry is badly oversold currently, but prospects are good. As always, the process that comes out on top will be the one which turns out the required quality at lowest cost.

Hot Machining's New Chance

Problems that go with tough, high alloys have led to new interest in the process. Economics, a barrier to its use with common metals, may be offset by other factors

NEARLY 12 years ago, metal-cutting researchers ran tests on heated metals. Their idea: Metals, like butter, might offer less resistance to the cutting tool if they were hot.

They were right. Tests showed that the shear strength of the work material drops off considerably at elevated temperatures, allowing the cutters to walk through with relative ease.

Although the process worked well in tests, it did not become a commercial success. Some experts now give it another chance. The big job: Machine the tough, high alloys, particularly those used by aircraft and engine makers.

Why the Delay?—Money, not the principle, has been the chief drawback.

First, the cost of adding heating equipment to the machine makes the technique impractical for many jobs.

Second, tool life drops as tool-tip temperature goes up. Gains in machinability can be canceled by losses in tool life. (One company poured $75,000 into an installation only to discover that the lost tool life made it impractical.)

The conclusion of some production men who've tried it: Hot machining is seldom practical for jobs that can be done with conventional machining techniques. The gains aren't big enough.

High Alloys—What about the metals that are nearly impossible to cut conventionally at anything approaching production rates?

The demand for production output of parts made from such alloys probably is sufficient to justify the equipment expenditure, and any betterment of the sluggish pace used today would be enough to sell production men.

While readily machinable steels offer better tool life at or near room temperatures, some of the high alloys give a markedly better tool life at elevated temperatures. It can probably be attributed to abrasion between the workpiece material and the tool. With easy-to-cut steels, the abrasion is fairly low, even at room temperature. As tool-tip temperature goes up, the tip loses its ability to withstand abrasion faster than the abrasion itself is reduced.

On the tough alloys, the abrasion is severe at room temperature. Boosts in temperature reduce the abrasion, and tool life climbs.

How's Business?

In the machine tool industry, it's slow. November new orders were $28.4 million, up only $600,000 from the October low.

Shipments during the same period dropped from $60.9 million to $47.4 million as builders trimmed production to get it in line with demand.

The Outlook—Whenever builders talk about 1958, they quickly cite their flurry of inquiries. Many feel that customers intend to buy new equipment, that the inquiries out now are of high quality, and that a fair share will be turned into orders.

When? Probably not until after the first half; that's the consensus. The big question for the second half is what the auto builders plan for their 1960 models. If substantial re-engineering is done, say new transmissions or engines, machine tool orders should come late this year. If that happens, builders feel 1958 may be reasonably good.

Lifting heavy beams for steel-skeletoned skyscrapers, over the heads of pedestrian and vehicular traffic, calls for careful loading — with safe slings, stout wire rope and a crane that's securely guyed with steel cables. Structural steelworkers practice safety because they know that...

life depends on it

Today, taller buildings, bigger bridges, deeper oil wells, greater construction projects require stronger, safer wire rope. And equipment operators know that when you buy "bargain" rope you're heading for headaches, trouble and expense. So don't bargain with safety. Buy wire rope on the basis of *quality*. Buy Wickwire Rope.

WICKWIRE ROPE — A CF&I PRODUCT

CF&I

LOOK FOR THE YELLOW TRIANGLE

5696

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
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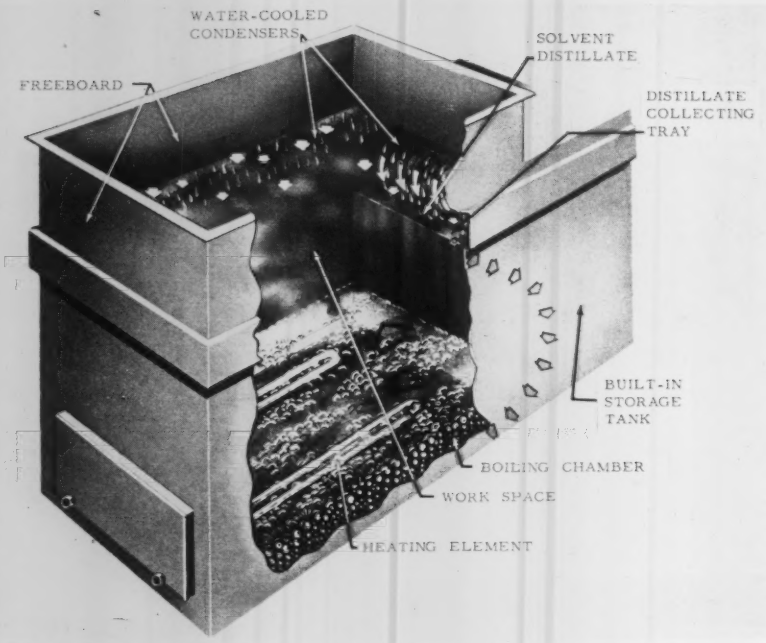


This is a typical degreaser which shows basic parts common to all vapor machines. Cold parts condense vapor, washing off soil. Condensers provide barrier to vapors

Some Stabilizers and Additives

Type	Example
Aliphatic Amines	Triethylamine Di-isopropylamine
Heterocyclic Nitrogen Compounds	Pyridine Pyrrole Alkyl pyrroles
Substituted Phenols	Guaiacole Creosol
Unsaturated Organics	Di-isobutylene Acetylenic alcohols
Oxygenated Organics	Alcohols Esters Normal ethers Inner ethers

ASTM Bulletin No. 219

How To Test Solvent Quality

By DR. C. E. KIRCHER
Manager of Research
Detrex Chemical Industries Inc.
Detroit

Performance is best way, says author. Analysis can be misleading unless it's correlated with results. Here are some basic facts about trichloroethylene that'll help you

INDUSTRY needs an accurate way to measure the quality of degreasing solvents such as trichloroethylene. The variety of methods proposed by manufacturers to establish the merit of their products often complicates the problem.

There are no simple performance tests, but users can evaluate the quality of trichloroethylene by understanding the answers to these questions:

1. How is the solvent made?
2. What is stabilization and how is it used?
3. How does the solvent deteriorate in use?

Production—Solvent degreasers remove lubricants, processing compounds, and antirust agents used during fabrication. Such compounds normally don't attack metals or the solvent.

Trichloroethylene is one of the most widely used solvents. Most of it is made by combining chlorine and acetylene and dehydrochlorinating the product. It is heated to a closely controlled temperature, and trichloroethylene is obtained by fractionation.

Stabilization—Commercial products differ in details rather than fundamentals of preventing deterioration (degrading). These factors must be recognized and controlled:

1. High temperatures. 2. Light and air (if no antioxidant is used). 3. Strong acidic conditions.

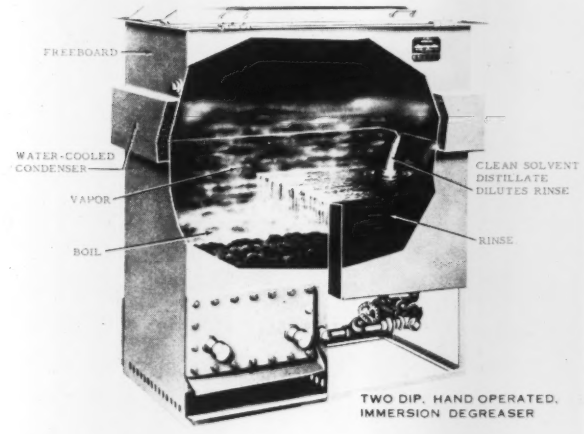
Producers use antioxidants and acid acceptors (1 per cent or less) to prevent deterioration. They must be volatile enough to vaporize and be recoverable when dirty solvent is distilled for re-use.

Standard stabilizers are either alkaline or nearly neutral. Their purpose is to keep the solvent from becoming acid.

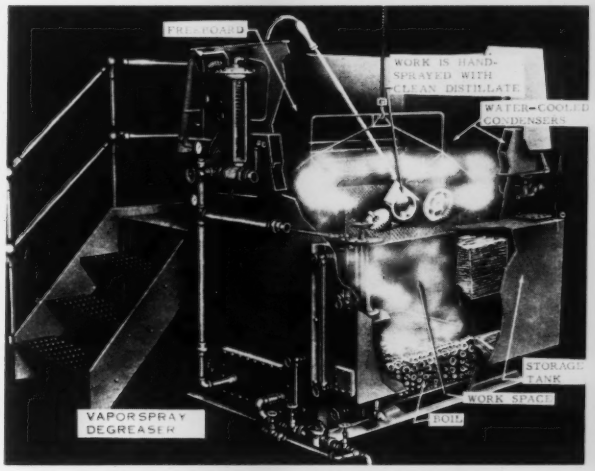
A small amount of an amine (between 0.001 and 0.01 per cent) in new solvent is enough to produce a pH of 10. (It's measured by shaking a small amount of solvent and neutral water in a test tube, and testing the pH of the water.)

Dual Role — Amine stabilizers also function as acid acceptors. More may be added than is needed to give the solvent a pH above 9.

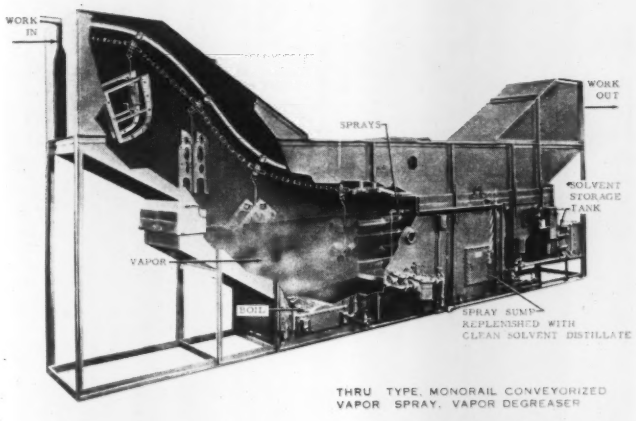
Here is the difference between alkaline and neutral stabilized trichloroethylene: The product is al-



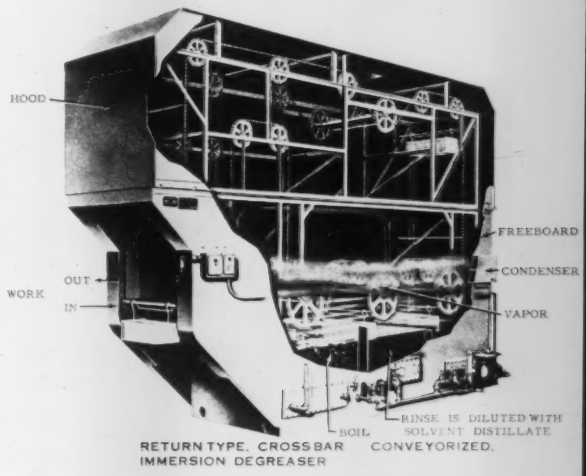
Here is a two dip, hand operated immersion degreaser. Extra rinse gives greater cleaning ability



Vapor spray type degreaser permits an operator to force hot fluid into remote corners to remove stubborn dirt



For continuous work, this equipment cleans intricate parts thoroughly and automatically. Conveyor chain is carried above condensers to avoid removing lubricant



This example works best for baskets of small parts. Parts pass through vapor and are dipped and rinsed automatically. Many are hand loaded

kaline if an appreciable amount of amine stabilizer is used (for example, 0.05 to 0.07 per cent); it is neutral if little or no amine is added (0.001 to 0.01 per cent). In either case, other stabilizers are added. Most commercial products are compatible and can be mixed.

In both cases it is necessary to add an antioxidant (also called a polymerization inhibitor). The same antioxidant can be used in either alkaline or neutral type solvents.

Other Additives—Stabilizing systems may also include small amounts of alcohol, ester, or ether. They are used to delay solvent breakdown if the solvent should become definitely acid.

Remember that such systems come into play only when the solvent has been abused through overheating, poor equipment maintenance, or the introduction of inorganic soils which produce acids.

Deterioration—A high percentage of soils removed during degreasing are petroleum-based products. They don't attack metal ordinarily, although a few react in the presence of water.

As a general rule don't bring strongly acidic soils into a degreaser. Anhydrous aluminum chloride should never be introduced. It is an acidic chemical which is sometimes used for research purposes to induce rapid solvent breakdown.

Normally, any acid soil that will attack a metal may impose a strain on the solvent. Neutral or alkaline soils do not.

Water and air can cause oxidation of metal surfaces. This can happen in a degreaser if it contains free water. Trichloroethylene doesn't react with water—small amounts aren't harmful. Moisture in a degreaser can increase corrosive attack if acid-forming soils or breakdown products are present.

(*Please turn to Page* 90)

REDESIGNED HEADSTOCK is massive, rigid casting, eliminating vibration and assuring maximum accuracy. Electric combination clutch and brake permits fast, smooth starts and stops without overheating. The Gisholt main control (manually or hydraulically operated) and the simple push buttons and feed-stop valves speed changeovers. A wide range of spindle speeds permits peak machining efficiency on all materials.

GISHOLT JETracer (mounted in place of standard front carriage) for either single or multiple pass work. For latter, JETracer will make up to four consecutive, automatic passes from four templates of different lengths and patterns. **Standard rear independent slide** can operate any time within the general machine cycle to complete the part. **Air- or hydraulically-operated tailstock** can be easily mounted, positioned or removed.

High capacity + flexibility = economy

ISN'T THIS WHAT YOU WANT

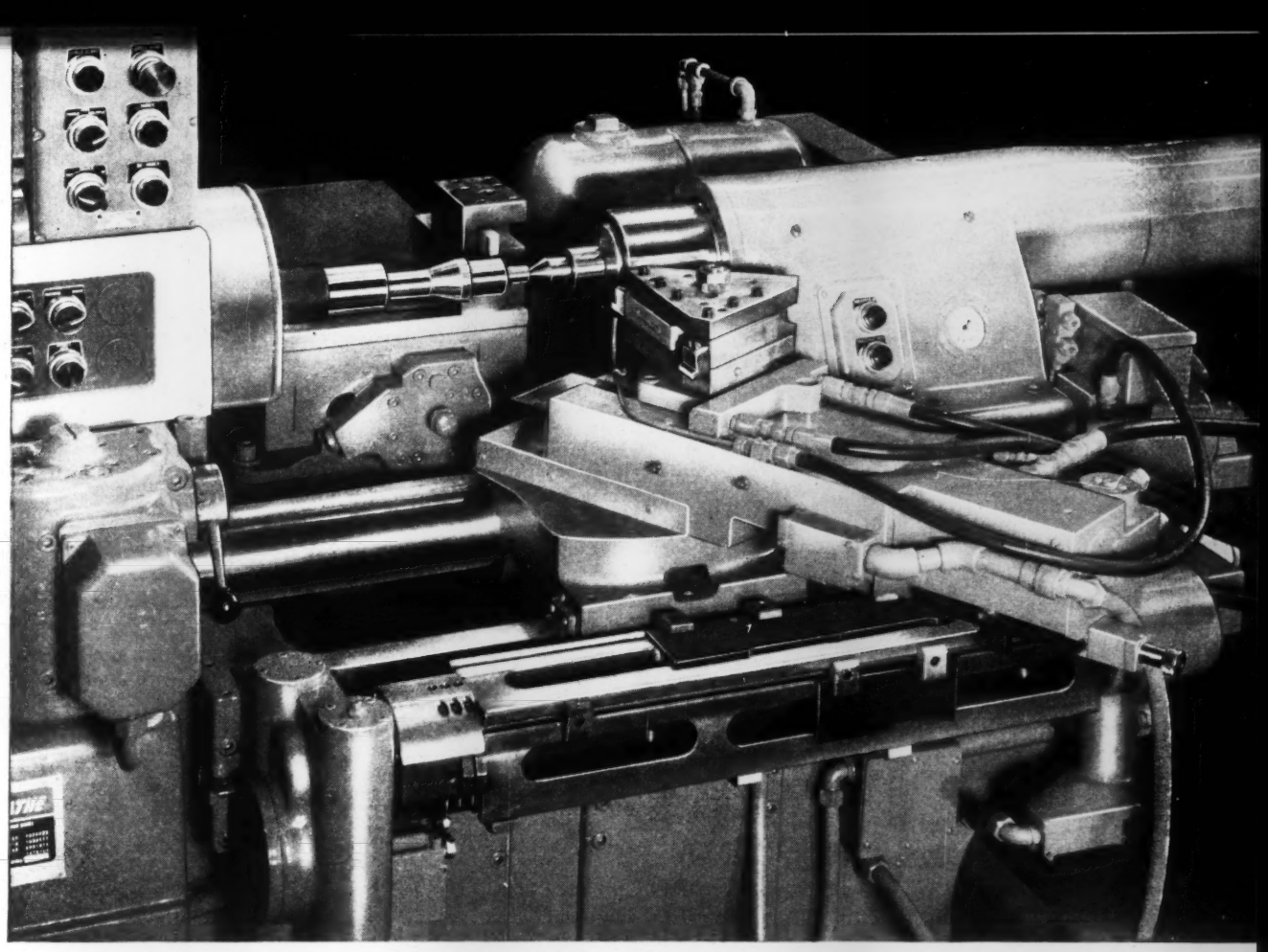
CONSIDER WHAT YOU CAN DO with this new Gisholt MASTERLINE No. 12 Automatic Production Lathe:

Here is an automatic lathe designed specifically for high production operations—yet this machine is flexible enough to handle a variety of similar parts in small repeat lots.

You can hold work in a chuck or fixture—with a work driver and tailstock—on an arbor or between centers. To start the automatic cycle, your operator simply loads the part, chucks it and raises the Main Control Lever. He is then free to handle additional machines—or to perform other work—until the part is completed.

On the Gisholt No. 12 Automatic, all carriage and slide movements are hydraulically actuated. The front carriage has both longitudinal and transverse motion—or a combination of the two—with quick approach, automatic tool relief and rapid return. You can mount the rear independent slide at any angle to machine bevel gears, drill cones, or handle other parts with angular surfaces.

For special jobs—like machining both ends simultaneously on small motor frames, cylinder sleeves,



IN AN AUTOMATIC LATHE?

or similar parts— you get even greater flexibility from the No. 12 through auxiliary slides, operated by movement of the standard slides. Or you can mount a back facing attachment within the spindle—for still another way to machine a maximum number of surfaces in one chucking. And for outstanding versatility with great savings in tool and setup costs, the front carriage on the No. 12 may be replaced by a single- or four-pass JETracer slide.

For complete details of the new features on the Gisholt MASTERLINE No. 12 Automatic Production Lathe, call your Gisholt Representative.

WRITE GISHOLT TODAY for advance data on the new Gisholt MASTERLINE No. 12 Automatic Production Lathe. Ask for Form 1178.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

This is a standard meter for measuring pH. Electrodes at right are inserted in upper, water layer. They should not touch lower layer of solvent since erratic readings result

Solvent Control Tests

Measuring pH

Get a sample of new solvent or condensate from a degreaser. Cool it to room temperature. Place 100 milliliters of the sample in a 250-ml beaker or Erlenmeyer flask. Add 100 ml of neutral water and mix thoroughly. Allow the liquids to separate by gravity and insert the pH meter electrodes into the upper layer. Read the pH.

Titration

If you want a pH titration for amine stabilizer, use this procedure: After checking the pH of the mixture (above), place the mixture in a 250-ml flask and add a small amount of standardized (0.1 normal) hydrochloric acid solution. Shake the flask thoroughly and pour the mixture into a beaker. Check the pH of the upper layer as before. Return the mixture to the flask and add another small amount of acid solution. Repeat measurements and small additions until a pH of 8 can be measured.

You can eliminate transfer from flask to beaker by using an electric stirrer. Keep the pH meter electrodes out of the lower layer of solvent. You'll get erratic readings otherwise.

You can also measure pH by titrating a sample with a standard chemical laboratory procedure.

TEST SOLVENT QUALITY . . .

Tests—Except for government specifications (MIL-T-7003 and OT-634), users have had to determine what is acceptable trichloroethylene. Opinions rather than facts often form the basis for many decisions.

Tests are designed: 1. To measure the characteristics or properties of a solvent. 2. To predict the performance of a solvent. (The list on Page 86 shows some typical additives.) By setting proper limits on such tests, a buyer can be reasonably sure that his purchase has a known purity and quality. Laboratory (reflux) tests are run to show: 1. The effect of solvent on the metal. 2. The effect of soils and metal on the solvent.

Affect Predictions—Corrosion of a metal sample indicates some solvent breakdown or attack by acids. The kind and amount are greatly influenced by moisture.

Excluding corrosion, the only other effect might be a slight staining from the stabilizers. It does not occur in the vapor phase. Any that occurs in immersion is the result of a much greater exposure time than is normal in a shop.

Any breakdown of solvent from metal or soil action can be immediately detected by an increase in acid and chloride ions. Some hydrochloric acid is always liberated when trichloroethylene degrades. It's easy to make a quantitative estimate.

Testing accuracy is diminished when you add acidic soils or those containing chloride ions. With oxygen present, breakdown rate in any laboratory test varies with the intensity of ultraviolet light, artificial or natural.

Lab Shortcomings — Prediction tests are more likely to be misinterpreted than those for checking specifications. They are frequently used as substitutes for performance. They are run in glass vessels—conditions which vary considerably from those in a plant degreaser.

It is important to remember that many chemical reactions involving added soils are profoundly influenced by the presence of water. Conclusions that may properly be drawn from laboratory (anhydrous) tests are not necessarily valid for shop conditions where there is some water.

Metals are essentially nonreactive. Metal compounds (iron and aluminum chloride, for example) are much more reactive than parent metals.

Accelerated laboratory tests require careful interpretation. Fouling of heat transfer surfaces by accumulated soils also is an important factor and is often ignored in laboratory testing. The initial development of color on adding a chemical type soil does not prove solvent breakdown.

Summation—Plant use is the most reliable test.

Laboratory tests are all right for prediction only if they can be correlated with shop degreasing practice.

Solvent degreasing is a physical process. Use caution when you try to interpret the results of chemical tests in terms of performance.

Adding acidic or reactive chemicals to accelerate breakdown in lab tests will prove almost anything. The several stabilizers in use react differently to soils. The reactions can only be explained by a chemist familiar with trichloroethylene and its stabilizers.

NEW THEW-LORAIN

"Square Tubular-Chord" Crane Boom

The Moto-crane, designed and built by The Thew Shovel Company of Lorain, Ohio, offers a uniquely light, powerful, maneuverable boom. Completely fabricated of Shelby Seamless Mechanical Tubing, the boom consists of four main chords of square tubular construction, reinforced by lacing of round tubing. In sizes, the main chords range from 2" x 2" x .189" wall to 4" x 4" x .250" wall.

The advantages of this type of construction are manifold. The square cross section of the four main chord members gives the greatest radius of gyration for column strength, 15% better than round members, 90% better than angles. This radius is the factor that gives square chord sections the greatest column strength per lineal foot of weight. The result is a weight savings of 20 to 30%, greater strength, and increased lifting capacity. It also permits handling and traveling with longer booms.

Why Shelby Seamless Mechanical Tubing was chosen...

Primarily, it offers the ultimate in strength and rigidity in proportion to its size and weight. Secondly, it is shock-absorbent, uniform throughout, dimensionally accurate, and possesses excellent machining and superior welding properties. It is produced under rigid standards, and is available in a generous range of diameters, wall thicknesses, various shapes and steel analyses.

Contact our engineers. Let them help you to adapt Shelby Seamless Mechanical Tubing to your specifications.

The 35TM Moto-crane unit with straight 105-foot boom and a 20-foot tip extension. Some of these booms have been as long as 200 feet.

National Tube Division, United States Steel Corporation, Pittsburgh, Pa.
(Tubing Specialties)
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Supply Division, Warehouse Distributors
United States Steel Export Company, New York

USS

SHELBY SEAMLESS MECHANICAL TUBING

A Product of National Tube

WALLS WITHOUT WELDS

UNITED STATES STEEL

SAFETY SWITCHES STAND UP UNDER 100,000 AMPERE SHORT CIRCUIT TEST!

INDEPENDENT TESTING LAB RELEASES FINDINGS AFTER GRUELLING "TORTURE RACK" TESTS

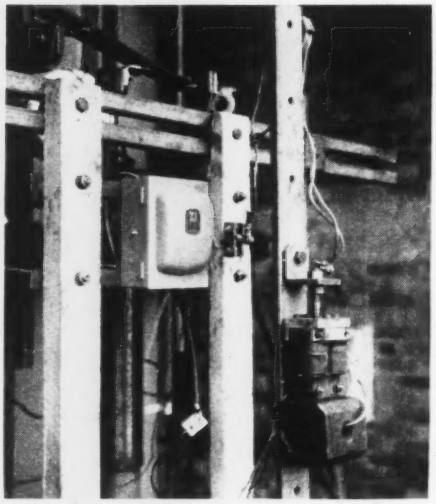
Unprecedented tests have been completed on 30 through 600 ampere rated Square D safety switches equipped with high capacity current limiting fuses. During these tests, switches were closed on a short circuit system delivering up to 100,000 amperes (symmetrical—R.M.S.). In addition, the fault was applied on the closed switches. *All switches withstood the shocks without any sign of failure!*

High Capacity Systems Demand Stamina

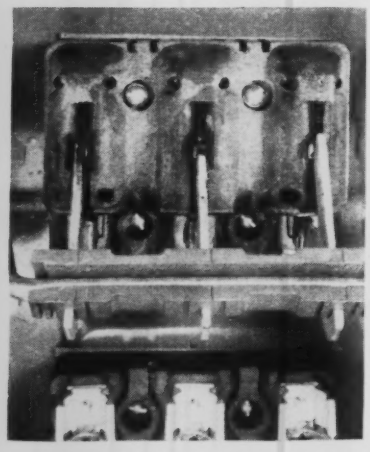
High capacity systems capable of delivering tremendous short circuits are becoming more and more prevalent with the growth of electrical loads. Network systems in metropolitan areas are a source of such faults. Another, the heavy industrial areas, with a concentration of sub-stations and rotating machinery. Terrific stresses and heat generated by such faults are serious hazards to both personnel and equipment unless properly contained. That is why proven protection for switching service and feeder circuits is of major concern.

Square D Standard Switches Do The Job

These tests offer conclusive proof that standard Square D Type HD and Type ND switches, equipped with high capacity current limiting fuses, can be used on such systems without fear of failure. You pay no premium for the proven performance they offer. Why settle for less?



Square D switch on "torture rack" during test involving up to 100,000 ampere short circuit



SUMMARY TABLE • Extract from Report No. S/NA R66—Sheet No. 5

Ampere Rating	Voltage Rating	Catalog Number	Average Symmetrical Prospective Current R.M.S.	Recovery Voltage R.M.S.	Maximum Total Arcing Time	Fuse Type
30	250	A85351	96,600	252	.0009	A2Y-30A
30	250	A85351	96,400	253	.0010	FRN-30A
30	600	A85341	107,000	590	.0020	A6Y-30A
30	600	A85341	106,000	601	.0027	FRS-30A
60	250	A86352	96,400	248	.0010	A2Y-60A
60	250	A86352	95,200	252	.0019	FRN-60A
60	600	A86342	106,000	605	.0011	A6Y-60A
60	600	A86342	108,000	598	.0020	FRS-60A
60	600	A86342	107,000	601	.0013	NAS-60A
100	250	A86353	95,200	253	.0009	A2Y-100A
100	600	A86343	108,000	604	.0014	A6Y-100A
200	250	A86354	95,200	253	.0037	A2Y-200A
200	600	A86344	107,000	602	.0011	A6Y-200A
400	250	A86355	95,900	252	.0039	A2Y-400A
400	600	A86345	106,000	611	.0050	A6Y-400A
600	250	A86356	94,500	251	.0062	A2Y-600A
600	600	A86346	107,000	601	.0062	A6Y-600A

Above • Extract of Nelson High Power Laboratory Report C/NA-66

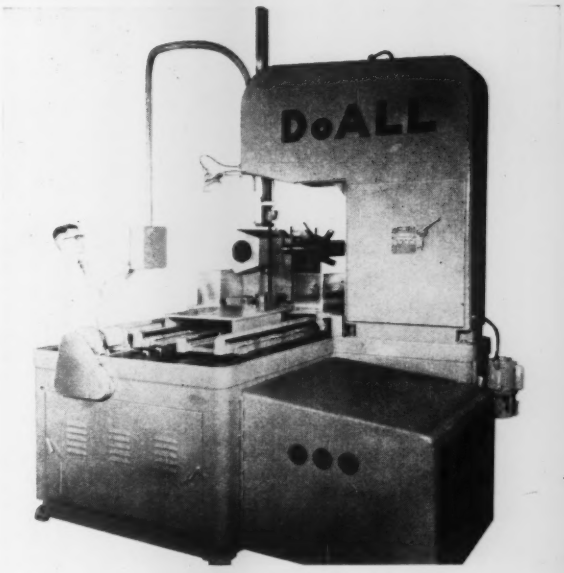
At left • No sign of failure in this switch interior after 100,000 ampere short circuit test

SQUARE D SAFETY SWITCHES GIVE YOU *Certified* PERFORMANCE!

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Band Mill Cuts Rapidly With Low Power Consumption



Model 26-5 will rip heavy plates, reface or shank forging dies, trim heavy castings, and slab massive billets.

Capacity is 24 x 26 in. Band speeds vary from 50 to 5000 fpm.

A sensitive variable feed moves the table as slow as 0.030 ipm for heavy work on high alloys. Hydraulic cylinders are used for rapid traverse and for feeding free cutting materials up to 8 fpm.

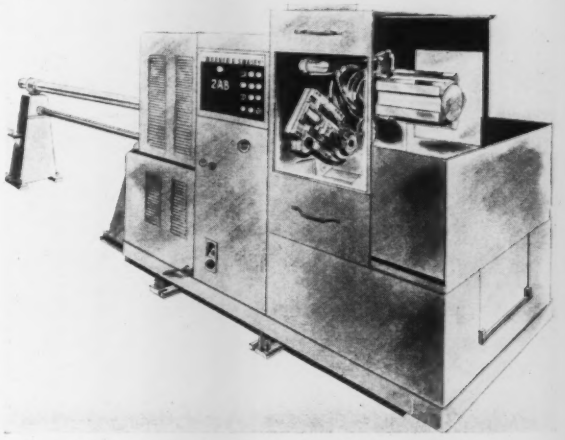
A meter in the pendant control station indicates band speed in feet per minute or table feed in inches per minute.

The adjustable pendant incorporates a panel of pushbuttons and selector switches. They actuate solenoid valves to control table feed and rapid table traverse.

Coolant is settled and filtered in a recirculating system.

Most of the waste material is removed in slabs or pieces that have high salvage value, a source of substantial savings, especially when working with expensive alloys. *Write*: DoAll Co., Des Plaines, Ill. *Phone*: Vanderbilt 4-1122

Automatic Bar Machine Handles Short and Long Run Jobs



The 2AB is a single spindle machine with a hydraulically operated chuck and a bar feed of 3 in. diameter capacity. Its design is based on the 2AC automatic chucking machine.

Bar feed strokes can be varied from ¼ to 10 in. A restocking indicator automatically shuts down the machine before the bar runs out, preventing cutting tool damage from improperly gripped stock.

A 25-hp single speed motor powers the machine. Spindle speeds, feed changes, cutting stroke length, turret indexing, and front and rear cross slide operation can be selected automatically during the machining cycle.

An independently operated cutoff slide is driven by the spindle and equipped with separate feed selection (0.0015 to 0.20 in.).

Operation of the slide can be started during any one of the pentagon turret strokes; cutoff progresses during other machining operations. The cutoff slide can also be used to face a new bar.

The machine's turret is located overhead, away from chips, coolant splash, and dirt. Turret and spindle bearings (pressure lubricated) are mounted in the same housing and undergo the same temperature effects.

Front and rear slides can be set up to operate individually or together with any turret face. "Normal" and "late" functions are available. Internal necks, grooves, and recesses can be machined. Cross slides are slanted downward 15 degrees for greater tooling ease and to provide tooling clearance.

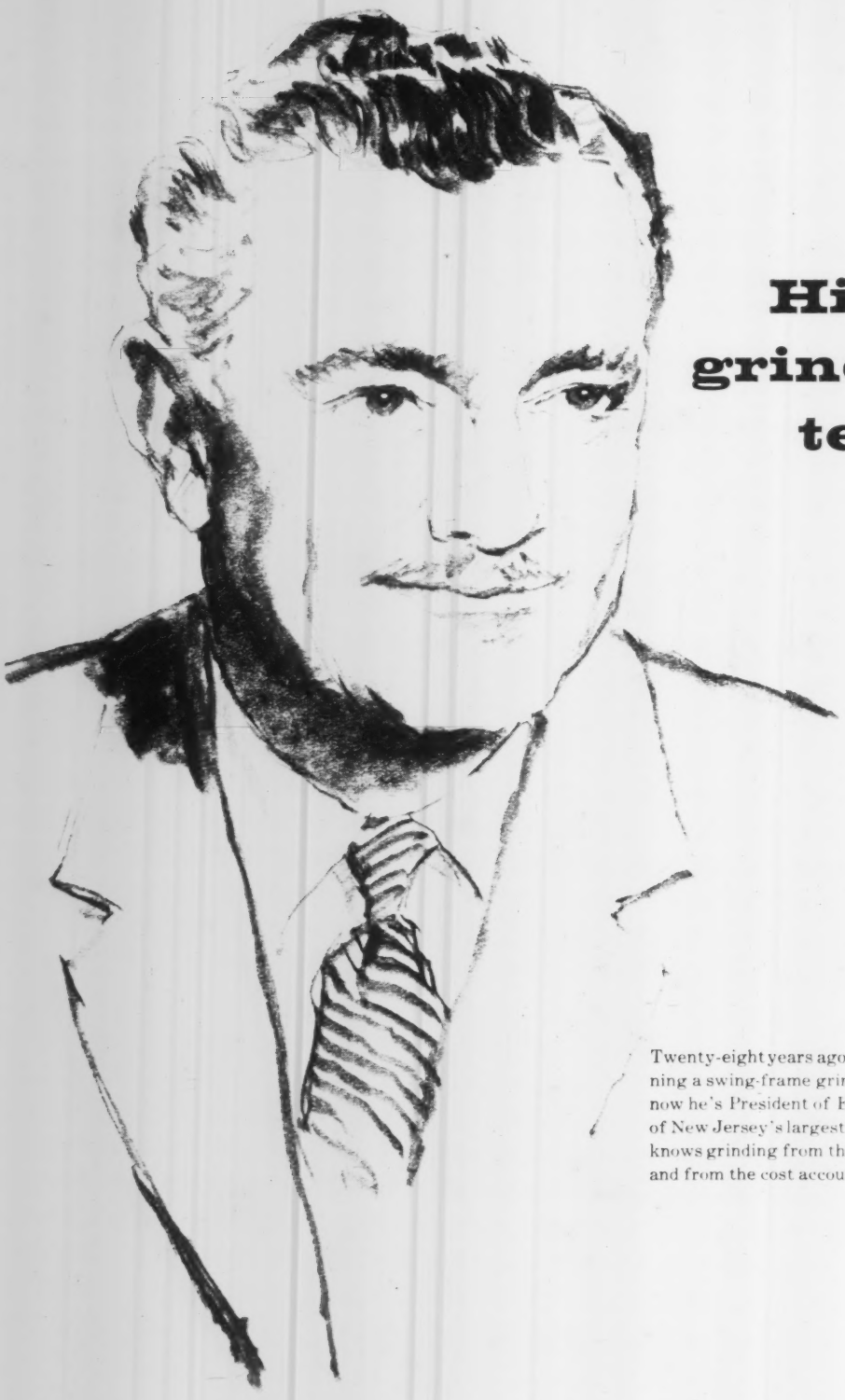
The machine can be set up quickly, like a turret lathe. There are no cams to change.

Adjustable trips on the control drum select speeds, feeds, and cutting stroke lengths. Easily inserted pins on a separate index drum automatically sequence all machine functions. Permanently mounted cams actuate both the turret and cross slides.

A manual high-low selector and six-speed transmission provides speeds from 120 to 1544 rpm in the high range and 56 to 728 rpm in the low range.

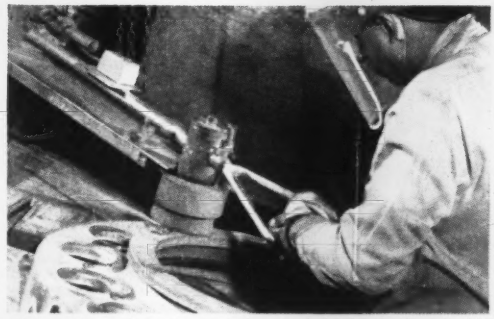
Six automatic feed changes (from a selection of 36 feeds) are available during the machining cycle, ranging from 0.0019 to 0.124 in. per revolution.

A swing-out tube makes loading from the front of the machine easy. *Write*: Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio. *Phone*: Henderson 1-5580



His new grinding technique

Twenty-eight years ago Jack O'Sullivan was running a swing-frame grinder for Crucible Steel... now he's President of Engineered Sales Co., one of New Jersey's largest abrasive distributors. He knows grinding from the operator's point of view and from the cost accountant's.

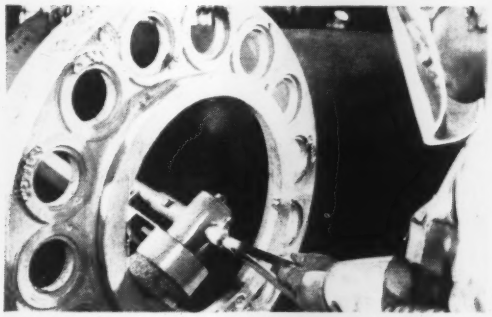


New baby swing-frame takes weight load of portable grinder off operator . . . enables him to grind smooth, flat surface without accidental scars and nicks due to fatigue.

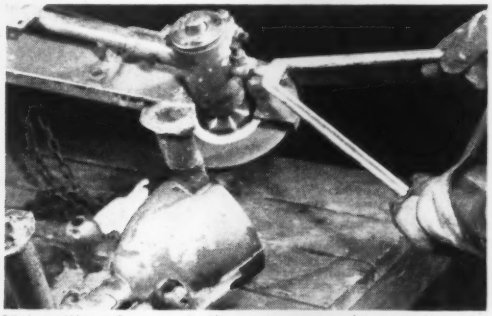
Big foundries have big grinding problems. For example, Cooper Alloy Corporation, pioneer in the production casting of stainless steel valves and fittings, had this one: they found that some grinding jobs just couldn't be done with big swing-frame grinders. Yet they were backbreakers when done with portables . . . expensive, too.

cuts costs and back-aches

They *were*, that is, until Bay State distributor Jack O'Sullivan came up with an idea. Working with Bay State and Fox Grinders, Inc., he devised a baby swing-frame that used the conventional cup and raised hub disc wheels normally used only on portables. This enabled Cooper's operators to grind hard-to-reach surfaces and notch or cut off sprues, gates and risers . . . without fatigue . . . and with a great deal more speed and accuracy.



Tricky I. D. grind demands a light, precise touch with a coarse-grained cup wheel (tapered or straight). Operator is free to concentrate on accuracy.



Versatility of new grinding set-up permits operators to use Bay State raised hub disc wheels ("hat" wheels) for notching and cutting off sprues, gates, risers.

Like Jack O'Sullivan, *all* Bay State representatives are more than just grinding wheel salesmen. That's why they often come up with ideas that result in basic operating improvements. Why not call in *your* Bay State man? **Better grinding at lower cost – that is his business.**

BAY STATE WHEELS of PROGRESS

BAY STATE ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts. *Distributors:* All principal cities.
In Canada: Bay State Abrasive Products Co., Ltd., Brantford, Ontario.
Branch Offices and Warehouses: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh.

NEW PRODUCTS and equipment

High Temperature Furnace

The Super-Temp furnace will operate at temperatures up to 4500° F for short time experimental work. Temperatures over 4000° F can be reached in 1 to 1½ hours.

A nonmetallic element is used. It has a 2 in. ID and a usable length of 12 in.

The furnace operates on 220 volt, single phase, 100 ampere power. It draws 13.4 kilowatts. *Write*: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich. *Phone*: Webster 3-9790

Hand Lift Trucks

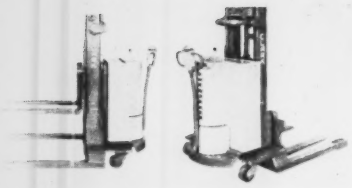
These Straddle Stackers have forks of 30, 36, 42, or 48 in. Model 20 STF can lift 2000 lb; Model 40 STF has a capacity of 4000 lb.

The trucks can lift and tier palletized goods to a height of 94 to 130 in., depending on which of seven available uprights is selected.

A drive unit mounted on a roller assembly moves up and down as much as 3 in. to compensate for uneven floors.

A butterfly switch in the head on the steering handle controls forward and reverse direction.

Brakes are applied automatically



when the steering handle is in either the vertical or horizontal position. It returns to the vertical position when released.

Either a single or double row 12-volt battery can be used. The truck travels 2.8 mph empty and 2 mph loaded. *Write*: Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich. *Phone*: Woodward 2-6561

Spray Gun

Model 19J saves paint when it is switched from one color to another. The spray gun and the quick detachable hose connection is purged of color with a "bleedoff" of only 2 to 4 fluid ounces.

Another gun is designed for use on automatic painting machines. Both guns have ⅜-in. material and ¼-in.-air inlets. *Write*: Binks Mfg. Co., 3122 Carroll Ave., Chicago 12, Ill. *Phone*: Van Buren 6-4200

Copper Plating

This sodium-copper cyanide double salt facilitates the makeup or replenishment of plating solutions. It eliminates several steps required to dissolve copper cyanide properly. *Write*: Electrochemicals Dept., E. I. du Pont de Nemours & Co. Inc., Wilmington 98, Del. *Phone*: Olympia 4-5121

NEW literature

Write directly to the company for a copy

Rotating Seals

Bulletin ML-177, 6 pages, describes quick release valves and a unit that transmits air, liquid, or gas under pressure or vacuum from a stationary source into a rotating shaft. Fawick Airflex Div., Fawick Corp., 9919 Clinton Rd., Cleveland 11, Ohio.

Car Dumper

A rotary dumper for hopper and gondola cars that uses a 30-hp drive to dump and return a car in 1 minute is described in this 16-page bulletin, 927. Heyl & Patterson Inc., 55 Fort Pitt Blvd., Pittsburgh 22, Pa.

Protective Coating

This 16-page bulletin describes a synthetic coating available in 22 colors for use on equipment, trucks, and floors. Mono-Seal Products, 44 Garden St., Everett 49, Mass.

Sculpture Machines

Tracer controlled machines for contour and profile milling are described in Bulletin CRS-57, 4 pages. Colonial-Romulus Div., Colonial Broach & Machine Co., Parkgrove Station, Detroit 5, Mich.

Worm Gearing

Bulletin CD-200, 24 pages, presents engineering formulas and instructions for using them in designing and applying double enveloping worm gearing to drives of all types. Cone-Drive Gears Div., Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

Combustion Units

A line of high frequency induction units and accessories for rapid combustion of laboratory samples is described in Bulletin T-1067, 12 pages. Laboratory Equipment Div., Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12, Ill.

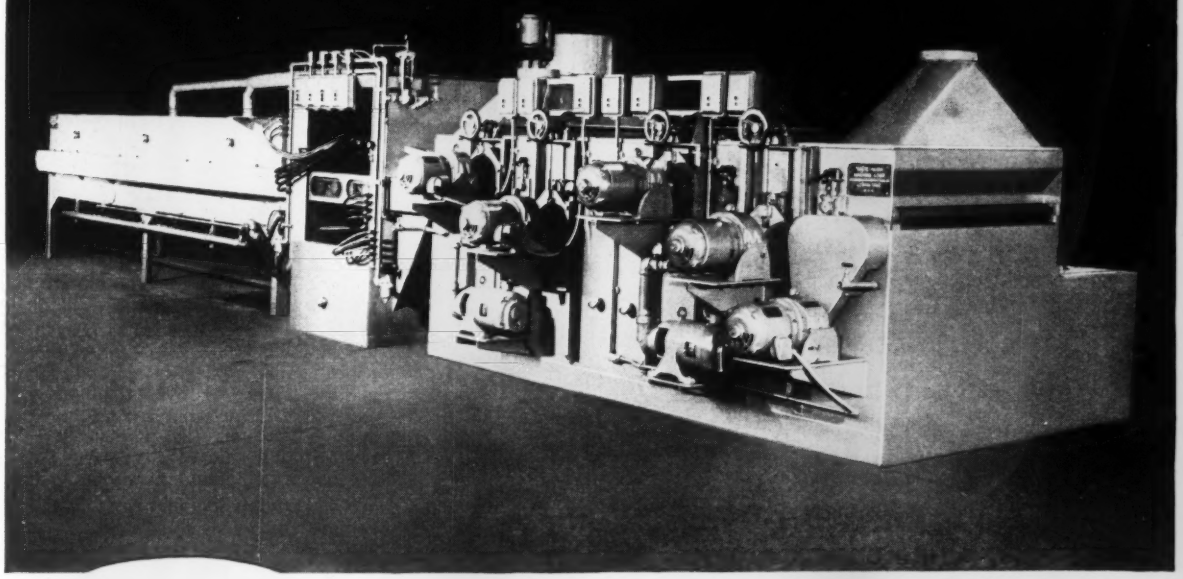
Nitrogen Generators

Packaged, self-contained nitrogen atmosphere generators with a one-station control panel are described in Bulletin N-557, 4 pages. Gas Atmospheres Inc., 20011 W. Lake Rd., Cleveland, Ohio.

Steel Bars

A free machining steel that reaches high strengths (140,000 psi) without annealing is described in this 24-page bulletin. LaSalle Steel Co., 1420 150th St., Hammond, Ind.

New complete service for metal preparation . . .



WHITE-ROTH

machines now available from Pennsalt Chemicals Corp.

White-Roth washers, coaters and dryers have an established reputation for outstanding metal surface preparation in leading appliance, automotive, aircraft and metal processing plants. Pennsalt's chemicals for metal processing provide the most complete line of specialized cleaners, coatings and lubricants in existence.

Now these chemicals and machines are offered together . . . in completely engineered installations . . . to take full advantage of the capabilities of each. Pennsalt engineers supervise installation and start-up, make regular service calls to check *system* performance, assure continuous operation. This unique combined approach gives you guaranteed processing with highest efficiency and economy.

If you are considering an installation, or would like to know if your present operation can be improved in any way, call or write Pennsalt for further information, or for a consultation and quotation. Metal Processing Department 556, Pennsalt Chemicals Corp., Three Penn Center, Philadelphia 2, Pa.

Metal Cleaners
Drawing Compounds
FOSBOND® Phosphate Coatings

A better start for your finish

Pennsalt Chemicals
ESTABLISHED 1850

J&L

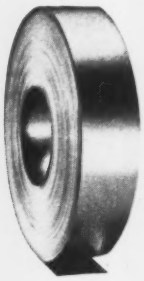
RESTRICTED SPECIFICATION
COLD ROLLED STRIP STEEL

Serves Typical Low Carbon End Use Requirements Such as these . . .

SIZE	8 x .045
ANALYSIS	1010
FINISH	#2 finish
HARDNESS	Non-Scalloping quality
THICKNESS TOLERANCE	± .0005 Incl. crown
WIDTH TOLERANCE	± .005
COIL SIZE	250# per inch of width
PACKAGING	Skidded

SIZE	12 x .032
ANALYSIS	1010
FINISH	#3 finish
HARDNESS	#4 Temper
THICKNESS TOLERANCE	± .0005 Incl. crown
WIDTH TOLERANCE	± .005
COIL SIZE	up to 200# per inch of width
PACKAGING	Paper interleaved—skidded and shrouded

SIZE	4 x .065
ANALYSIS	1010
FINISH	#2 finish
HARDNESS	#3 Temper
THICKNESS TOLERANCE	± .0005 Incl. crown
WIDTH TOLERANCE	± .005
COIL SIZE	Cut lengths
PACKAGING	Skidded



Many times, by varying processing methods, J&L is able to develop properties in cold rolled strip steel which greatly facilitate production operations and/or give the product superior qualities without adding to end product cost. End result is lower costs through improved products or better assembly and improved yield.

We believe you will find it worthwhile to investigate the possibilities of J&L Restricted Specification Cold Rolled Strip Steel applied to your production.

THE 4 IN 1 SOURCE FOR YOUR COLD ROLLED STRIP STEEL

Now there are four J&L plants with facilities for production of "Restricted Specification" cold rolled strip. Strategic locations at Youngstown, Indianapolis, Los Angeles and Kenilworth, N. J., provide the security of 4 sources of supply plus the close working relationship which these local production centers make possible.

J & L STRIP STEEL DIVISION PRODUCTS

Low Carbon, High Carbon, Annealed or Hardened and Tempered Spring Steel, Electro Galvanized or Hot Dipped Continuous Galvanized, Tin Coated, Alloy, Stainless.

J&L STEEL

Jones & Laughlin
STEEL CORPORATION
STRIP STEEL DIVISION
GENERAL OFFICES: YOUNGSTOWN 1, OHIO
PLANTS: YOUNGSTOWN • INDIANAPOLIS • LOS ANGELES • KENILWORTH, NEW JERSEY
SALES OFFICES: NEW YORK • ROCHESTER • NEWINGTON, CONN. • YOUNGSTOWN • CLEVELAND
DETROIT • INDIANAPOLIS • CHICAGO • LOS ANGELES • SAN FRANCISCO
FORMERLY THE COLD METAL PRODUCTS COMPANY

Market Outlook

STEEL PRODUCTION will turn upward before long if scrap prices are an accurate barometer.

STEEL's scrap price composite rose 16 cents a gross ton in the week ended Jan. 8. The composite, now at $33.33 a gross ton, is $1.33 above the 1957 low point recorded in the week ended Dec. 11. The three weeks after that saw it at $33.17.

EARLY SIGN—Thirteen months ago, the composite broke downward from record highs. Except for May and June, it went downhill all year.

Three months after the composite began its decline, steel ingot production turned downward, a trend that persisted throughout 1957.

SPARKER—The current advance in the scrap price composite came from an upturn in No. 1 heavy melting steel scrap at Pittsburgh. In the East, brokers buying material to fill contracts are having to pay more than they agreed to charge.

SOURCE OF STRENGTH—The strengthening in scrap prices comes primarily from domestic influences. There isn't much export demand. The government is permitting the exportation of iron and steel scrap under open-end licensing for the first quarter. This means there are no quantitative limitations. The Bureau of Foreign Commerce of the U. S. Department of Commerce believes that scrap supplies are adequate to meet U. S. needs, as well as the indicated requirements of other countries. Foreign demand for heavy melting scrap, the grade most wanted by other nations, will be lower in 1958 than in 1957, the government thinks. The Commerce Department will keep the export demand under review.

MODERATE—The price upturn in scrap is moderate, and it is likely that any near-term increase in steel output will also be moderate. The two largest steel consumers—automobiles and construction—do not have the bounce they had last year.

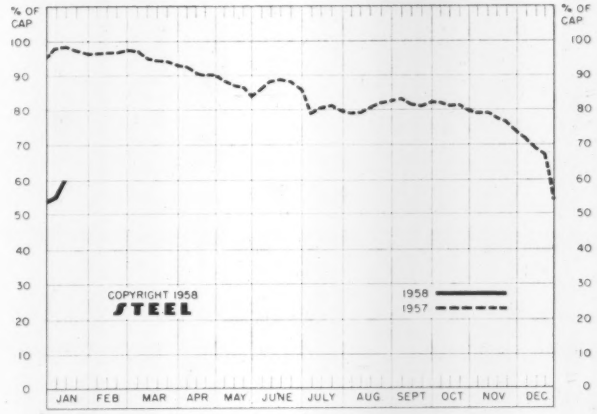
Lightened requirements of the two largest consumers, along with increased steel production capacities, result in a surplus of supplies for everyone. Many consumers have bigger inventories than they want, and they are trying to work them off. A reduced rate of consumption is making them last.

SLOW PACE—Inventory reduction and lowered consumption dampen the placing of new orders for steel. Result: An ingot rate of only 60 per cent of the 1957 capacity. (Capacity figures for 1958 will be announced soon.) The 60 per cent rate yields 1,535,700 net tons of steel for ingots and castings a week. Output in the comparable week last year was 2,519,000 tons.

The 60 per cent rate for the week ended Jan. 12 was a 5-point gain over that of the preceding (holiday) week.

PRICES—Mill prices remain steady and hold STEEL's price composite on finished steel at $145.42 a net ton. There are concessions, though, in the form of mill absorption of freight to attract distant customers. Warehouses are also absorbing freight. Competition among fabricators of structural steel is softening prices of steel in place.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Jan. 12	Change	Same Week 1957	Same Week 1956
Pittsburgh	54.5	+ 3.5*	100	102
Chicago	62.5	— 5*	98	98.5
Mid-Atlantic	77	— 3	102	97
Youngstown	61	+13*	102	98
Wheeling	55.5	+ 1	98.5	97.5
Cleveland	51	— 6.5*	92.5	96
Buffalo	53.5	— 2.5	107.5	105
Birmingham	62.5	— 9*	94.5	95.5
New England	55	+ 5	73	94
Cincinnati	62	— 3*	99.5	86.5
St. Louis	86	+12*	95.5	99.5
Detroit	68.5	— 5*	101.5	105
Western	79	+ 2	102	103
National Rate	60	+ 5	98.5	98

INGOT PRODUCTION‡

	Week Ended Jan. 12	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	96.4†	93.4	110.2	156.8
NET TONS (In thousands)	1,548†	1,501	1,770	2,519

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956.

WASHBURN
Phosphate Coated
MUSIC WIRE

. . . especially merits your careful investigation if you are interested in superior uniformity of PHYSICALS. This wire amazes the Spring Manufacturer when he tries it on his most difficult jobs.

A trial order will convince you.

108

WASHBURN WIRE COMPANY NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS – STRIP – RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

Welded steel chain is inspected visually prior to shipment from the Hammond, Ind., plant of S. G. Taylor Chain Co. Inc. Every link is checked

Chainmakers See Good Year

Great diversity of markets assures continuing demand for welded and weldless chain. Baby boom spurs sales for playground equipment; industry is still biggest user

CHAINMAKERS are fairly certain that their business in 1958 will be no worse than it was in 1957, which was a pretty good year for them. Reason: The products of this relatively small industry (welded and weldless chain) fill needs which are not subject to fluctuations in business conditions.

By far, the largest uses of chain are found in industry, although a lot is sold by retail hardware stores. Officials of Campbell Chain Co., York, Pa., say nine Standard Industrial Classification categories cover the majority of markets served by the industry: Primary metal; fabricated metal products; machinery; electrical machinery; transportation equipment; lumber and wood products; stone, clay, and glass products; coal mining; crude petroleum; and natural gas.

Growth Areas—One of the fastest growing markets is not strictly in the industrial field: In recent years, playground equipment has been a huge market for weldness chain. The rapid acceptance of backyard swing sets has been a boon. With the birth rate setting records every year, this market is far from saturated.

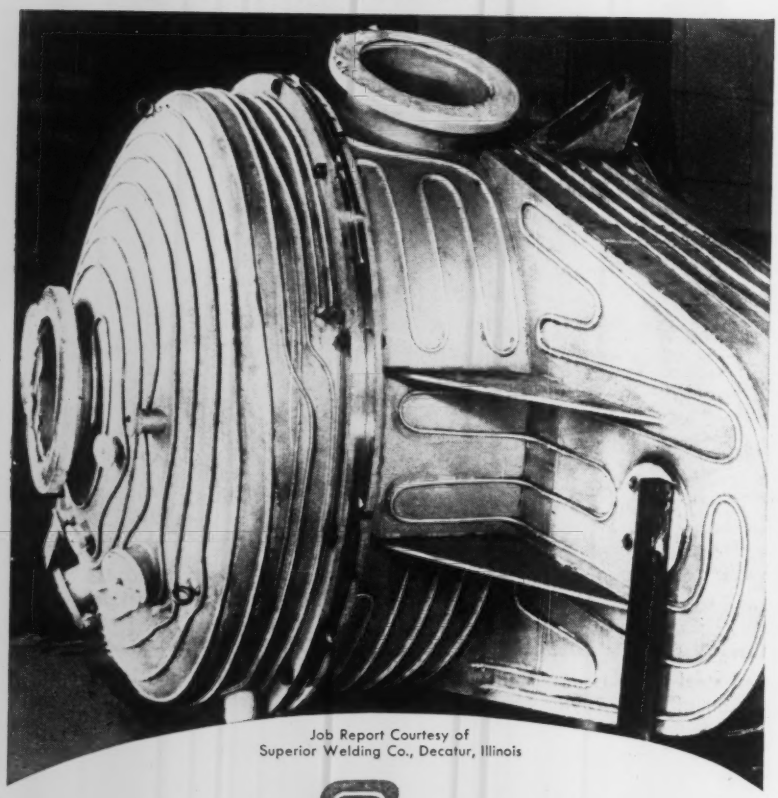
Industry is buying more chain, too. It is used wherever high relative strength to weight and great flexibility are required, say spokesmen of American Chain & Cable Co. Inc., Bridgeport, Conn. One growing application: Chains hold down trucks on piggy-backing railroad cars. Material handling (sling chains) is a steadily expanding market, too.

Something New—There are few really new uses for this product which had its beginnings in pre-Roman Empire days. But there are new wrinkles in marketing. For several years, the trend in distribution has been from bulk sales to package selling. The shopping center and self-service stores have made it necessary to market chain in small, easily identified packages. The evolution of such packages is far from over.

Pricing is also undergoing a change. Until a few years ago, chain was bought by the pound, a practice dating back to when link sizes were not as uniform as they are today. Around 1950, price per foot became standard in the industry for both welded and weldless chain.

Big Problem — Specifications

When stainless welds must be VACUUM TIGHT

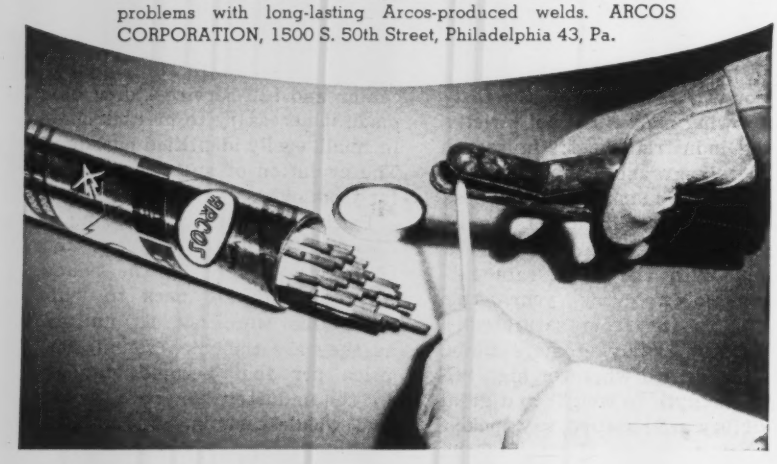


Job Report Courtesy of
Superior Welding Co., Decatur, Illinois

WELD WITH ARCOS

STAINLESS ELECTRODES

Shown here is a stainless steel furnace body of type 304 ELC for use under very high vacuum conditions in the casting of metals where exceptional purity is required. Arcos Chromend K-LC Stainless Electrodes were used because Arcos electrodes not only assured the proper weld metal chemistry, but also the necessary soundness to insure vacuum tight welds. Save money and future problems with long-lasting Arcos-produced welds. ARCOS CORPORATION, 1500 S. 50th Street, Philadelphia 43, Pa.



have long been a problem. According to R. L. Ekstrand, executive secretary of the National Association of Chain Manufacturers, Chicago, there are no industry standards today. Chainmakers use federal specifications RRC271, ASTM specifications, American Bureau of Shipping specs, and Association of American Railroads standards. With 18 to 20 manufacturers using four sets of specifications, there is a real need for standardization. Mr. Ekstrand says that the industry has been working on its own chain specifications for several years, and it is possible that they may be forthcoming in the next six months.

Another major problem for chainmakers is foreign competition. Not too long ago, imports were negligible, according to officials of Hodell Chain Co., a division of National Screw & Mfg. Co., Cleveland. But today, chain made in Western Germany, Italy, and Japan is cutting deeply into the market. Quality is good, especially for the German chain, and price is below that of the domestic product.

Materials—Most chain is made of low carbon steel (1008) wire or rods. But stainless and alloy steel are finding wider use where extra strength or corrosion resistance is a factor. Officials of McKay Co., Pittsburgh, report that the Navy has been buying large amounts of manganese chain for buoy installations. Manganese work hardens and develops a hard crust which resists water. McKay also reports growing demand for aluminum and stainless steel chain, although from a tonnage basis, they still are considered specialty items. Brass and bronze are also used.

Welded accounts for most of the tonnage, while weldless may have the edge on footage. American Chain & Cable says there are four basic types: Straight link and twist link welded chain and wire formed and stamped flat metal weldless chain. (American Chain & Cable lists more than 400 different chains in its catalog.) This does not include such types as the forged rivetless chain made by Jervis B. Webb Co., Detroit. (It is a weldless chain used largely by the automotive and material handling industries.)

Sheets, Strip . . .

Sheet & Strip Prices, Pages 109 & 110

Carbon sheet buying for the first quarter continues to be slow; most orders are for prompt shipment. Users are not anticipating requirements, though many have worked inventories down considerably. In some instances, stocks of finished goods are slowing sheet consumption.

With small backlogs, sheetmakers are scheduling tonnage well ahead of normal leadtime to meet the pressure for prompt shipments.

Cutbacks in auto assemblies are restricting purchases of cold and hot-rolled sheets. Suppliers of auto parts, confronted by short and irregular runs, are not covering needs far ahead. When they order steel, they specify quick delivery.

Some Detroit sellers of cold rolled report January demand is about 12 per cent above December volume. Not much change is expected in February. Much of the current improvement stems from better demand on appliance account, rather than automobiles, but appliance inventories are said to be still on the high side.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 108

Reinforcing steel demand is expected to spurt this spring. The large volume of toll road and highway construction scheduled for 1958 assures strong demand.

Expansion in highway work is likely to boost demand for reinforcing bars more than it does for structural shapes. In Illinois, for example, many bridges scheduled for fabricated structural steel were redesigned for prestressed concrete to expedite construction.

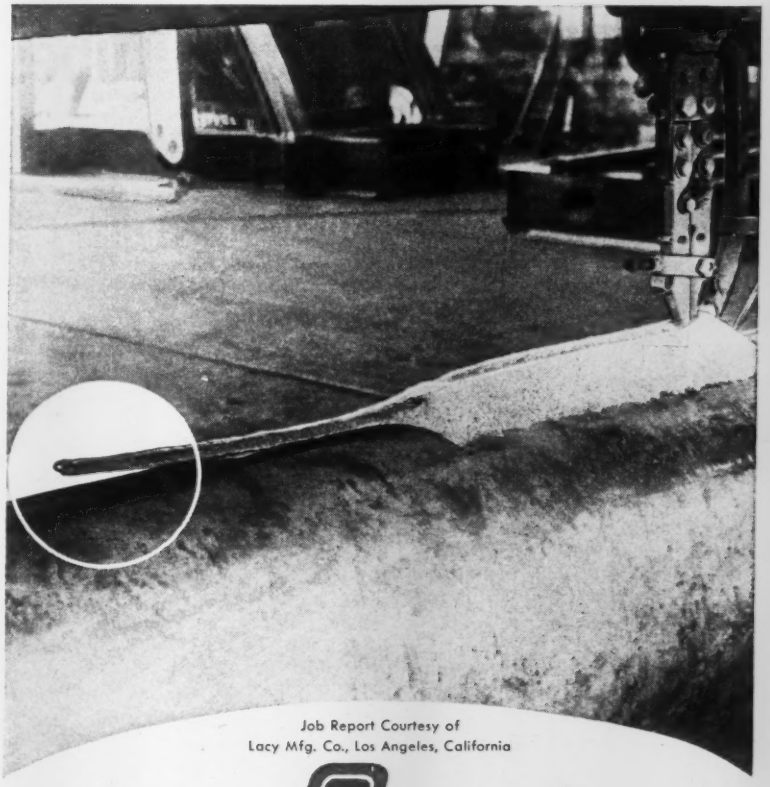
Steel Bars . . .

Bar Prices, Page 108

Bar consumers continue to ask for prompt shipment. Volume for the first quarter has not improved, and most buying is of fill-in type. In the East, forge shops are placing small lots for delivery within ten days, and numerous sizes of cold-finished bars can be shipped from stock.

Producers are competing for bar orders, and while base prices are holding, orders are frequently

Now, submerged arc stainless welds with slag that "pops-off"



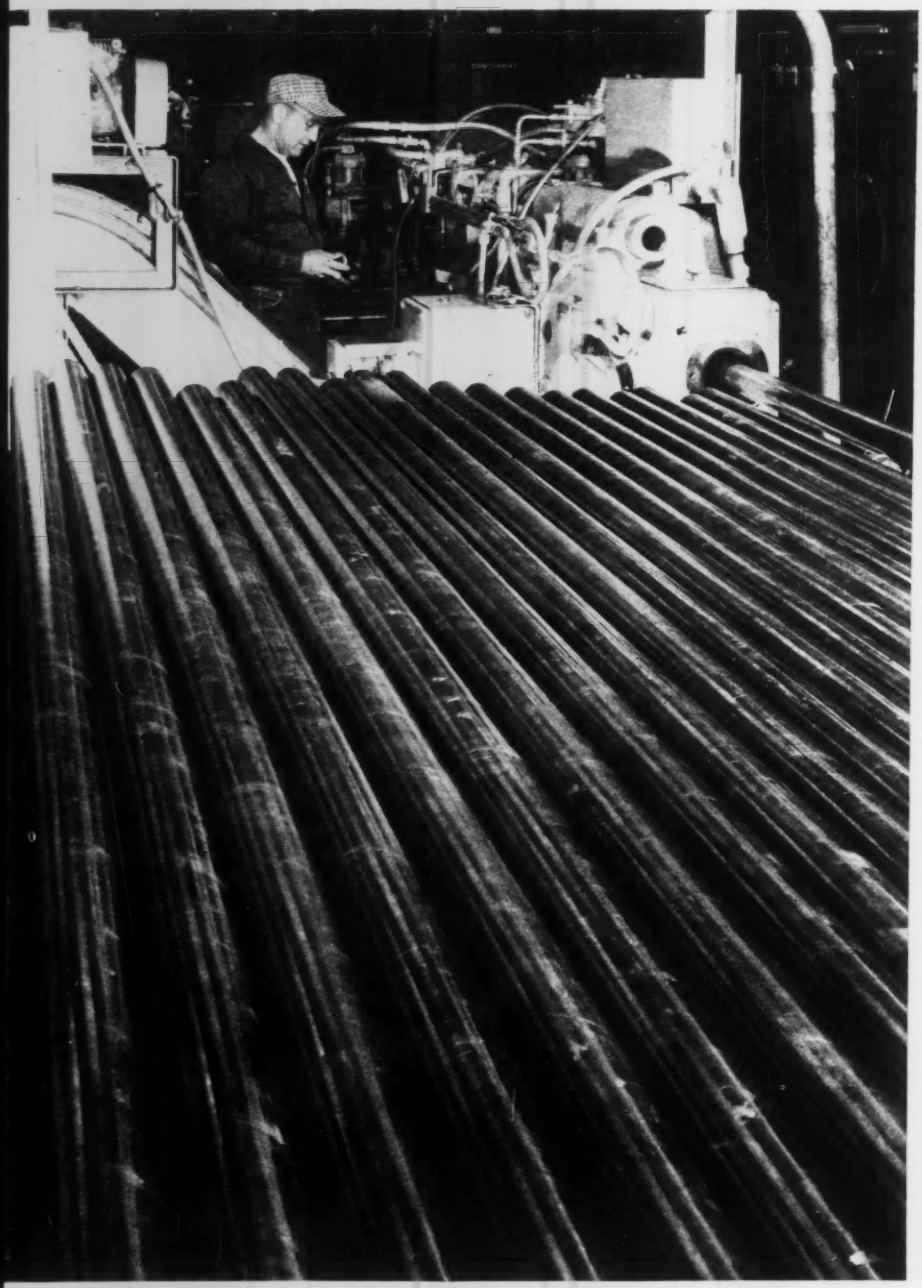
Job Report Courtesy of
Lacy Mfg. Co., Los Angeles, California

WELD WITH ARCOS

Stainless Wire and Arcosite Flux

Arcos research and experience with stainless weld metal now pays you *another dividend*—for the first time . . . consistently *self removing slag!* On the job above, submerged arc welding of a section of pipe for petroleum equipment, two passes were made with 1/8" coiled CHROMENAR KMo Stainless Wire and ARCOSITE S-4 Flux. As the photo shows, the cooling slag is lifting free by itself . . . leaving a clean, smooth bead. Think what this can mean to you on your own submerged arc welding jobs . . . saving time and money . . . better welds than ever before. ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

Brand New Transmission in 1958 Cars Uses Pittsburgh Steel Tubes For 3 Key Parts



Here's the raw material for a critical part in a brand new automobile transmission for 1958. These seamless mechanical tubes, a product of Pittsburgh Steel Company, will be cut to size on the machine in the background and processed into shafts for grade retarders.

Developing and producing a new transmission for a leading car challenges suppliers as well as the automaker himself.

Pittsburgh Steel Company's seamless mechanical tubes successfully met such a challenge by making good on three critical parts for a new transmission making its debut in 1958 models.

Ability of Pittsburgh Steel's tubes to meet this auto manufacturer's high requirements and rigid testing assures tube users in other fields of high, uniform quality.

Tubes from the mills of Pittsburgh Steel are used for these transmission parts:

1. Convertor Reaction Shaft—This shaft takes the torque (turning force) built up by the torque convertor and transmits that torque to the gears.

The convertor reaction shaft is made of seamless mechanical tubing with an outside diameter of 2.219 inches and an inside diameter of 1.505 inches. It is cut to size, centered, given centerless grinding, heat treated and broached—or sized—to a tolerance of .001 inch. Welding and final processing follow.

2. Grade Retarder Shaft—This part is a new feature in auto transmissions. It gives cars a new driving range which improves control on steep downgrades and on slippery surfaces without shifting gears.

The shaft is made of tubing 2.375 inches outside diameter and 1.531 inches inside diameter.

3. Front Pump Driven Gear—This gear is an essential part of the new transmission's hydraulic control system. It maintains correct oil circulation and pressure within the transmission.

The finished gear, measuring $4\frac{3}{16}$ inches o.d. and approximately $\frac{5}{8}$ inch on the i.d., has 36 gear teeth. The teeth are broached simultaneously on a vertical broacher.

All three parts are made from carbon steel seamless mechanical tubing which is cold drawn and finished to

(Advertisement)

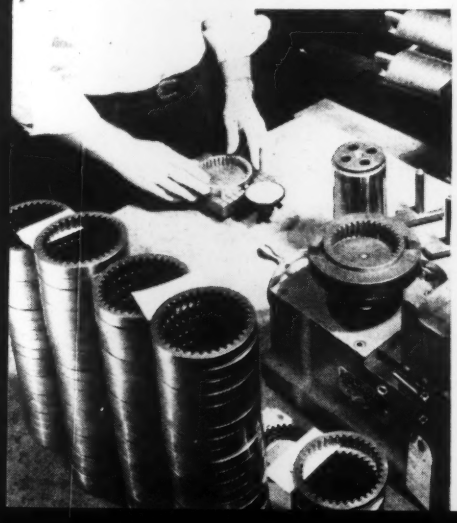
Convertor reaction shafts, made from Pittsburgh Steel's seamless mechanical tubing, are assembled into transmission cases at this station in an automaker's huge plant. The shaft transmits torque to the gears.

exacting specifications. The automaker who chose Pittsburgh Steel's tubing for three transmission parts carefully spelled out his specs for fine grain structure, machinability and weldability.

Those specifications were met by skilled tube mill men so that finished tubes were uniform—from length to length and from one shipment to another.

A measure of their skill is demonstrated by broaching which gives tubing grain structure a critical test. Rejects from peeling or chipping drop with Pittsburgh tubes.

Coming off an automated production line, these gears will be assembled into a front pump on a new type of auto transmission.



Machinability also is a severe test. In operations where tolerances are held to one-half of one thousandths of an inch, good machinability results in even, smooth production of parts which will pass sharp eyes of inspectors.

Welding operations carried on in automated lines can't be a haphazard operation or one in which quality of welds isn't uniform. Here again Pittsburgh Steel tubes keep production flowing smoothly and produce welds which hold up in field service.

Whether you're making automobile transmissions, hydraulic cylinders, axles or any other product requiring good tubing, you'll profit when you turn to Pittsburgh Steel. Skill of the men in the mill, modern equipment, engineering and metallurgical service available all combine to give you a satisfactory product—one backed by service and dependability.

Act today to get better tubes and service. Telephone or write the nearest district sales office listed below. You'll be glad you did.

Pittsburgh Seamless Distributors

Baker Steel & Tube Company
Los Angeles, California

Chicago Tube & Iron Company
Chicago, Illinois

Cleveland Tool & Supply Co.
Cleveland, Ohio

Drummond McCall & Co., Ltd.
Montreal, Quebec, Canada

Edgcomb Steel Company
Philadelphia, Pennsylvania

Gilmore Steel & Supply Co.
San Francisco, California

Earle M. Jorgensen Co.

Perry Kilsby, Inc.
Los Angeles, California

Mapes & Sprowl Steel Co.
Union, New Jersey

Metal Goods Corporation
St. Louis, Missouri

Miller Steel Company, Inc.
Hillside, New Jersey

A. B. Murray Co., Inc.
Elizabeth, New Jersey

C. A. Russell, Inc.
Houston, Texas

Ryerson, Joseph T. & Son, Inc.
Chicago, Illinois

Solar Steel Corporation
Cleveland, Ohio

Steel Sales Corporation
Chicago, Illinois

Tubular Sales
Detroit, Michigan

Ward Steel Service Company
Dayton, Ohio

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta, Chicago, Cleveland, Dallas, Dayton, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Tulsa, Warren, Ohio

(Advertisement)

placed with shipment a major factor. Banks of billets and other semifinished are substantial.

The Sierra Drawn Steel Corp., Los Angeles, has signed an agreement with the Columbia Steel & Shafting Co., Pittsburgh, establishing Sierra as a western source of supply for complete lines of cold-finished steel bars and flats.

Plates . . .

Plate Prices, Page 108

Some plate mills are booked nearly full on the heavier and wide sizes for February shipment. They have been accepting first quarter orders since mid-November. Light plates are in easy supply, with large consumers holding comfortable inventories.

Eastern mills' backlogs are smaller. Tank and vessel requirements are down in the area. The same is true of weldments for heavy equipment. Of the major consuming industries in the district, the shipyards are providing strongest demand, requiring more low alloy, high tensile material for hull plates.

Tool Steel . . .

Tool Steel Prices, Page 112

Shipments of high speed and tool steel (excluding hollow drill steel) came to 7056 net tons in November, reports the American Iron & Steel Institute. Comparisons: 7435 tons in October and 9889 in November, 1956.

Through November, shipments for the year amounted to 92,002 net tons, compared with 117,194 in the like 11 months of 1956.

Tubular Goods . . .

Tubular Goods Prices, Page 112

Pipe and tubing sales continue to decline. Demand for buttweld standard pipe is seasonally slow. It should pick up in the spring when building is resumed. Jobbers are still cutting stocks. Mechanical tubing orders from the warehouses are limited.

An oil country goods producer reports large-scale reduction of inventories by well drillers is likely to continue through March, softening demand throughout the first quarter.

Republic Steel Corp. last week announced the cancellation of plans to cut back operations at its Gadsden, Ala., plant. The planned layoff of 1500 workers will not be carried out.

Production of large diameter pipe at Gadsden is scheduled to continue. The change in plans results from a rearrangement of orders in the production schedule.

Warehouse . . .

Warehouse Prices, Page 114

No improvement in sales during the first quarter is expected, says the manager of a major warehouse in Pittsburgh. His firm, as well as other distributors, looks for demand to continue its decline this month, then level off through February and March.

Some increases in demand for such products as standard pipe and galvanized sheets may result from expected gains in housing starts in early second quarter. Currently, mills can furnish such rapid delivery on all products that many customers have switched from warehouses to mills.

Product shortages have definitely ended, except for some local situations involving slow delivery of heavy plates.

Stainless Steel . . .

Stainless Steel Prices, Page 112

Stainless steel sellers in the Detroit area expect fewer orders in February than in January—and it was down from December. Stainless deliveries are running about ten days.

Wire . . .

Wire Prices, Pages 110 & 111

Seasonal factors should stimulate increased demand for merchant wire products over the coming weeks. Chicago district sellers report a quickening in buying has started.

Semifinished Steel . . .

Semifinished Prices, Page 108

Phoenix Iron & Steel Co., subsidiary of Barium Steel Corp., resumed operations at its Phoenixville, Pa., mill on Jan. 6. Plans are to start up the Harrisburg, Pa., plant on Jan. 13. Both were closed in mid-December.

Imported Steel delivered on Domestic Terms

No red tape! We deliver to any place in North America. Over 10 years of service to more than 2000 North American accounts—as a domestic firm, on domestic terms—with lower costs or better deliveries. Write for "How to be at home with products made abroad" and the address of your local Kurt Orban Company representative.

Prices per 100 lbs. (except where otherwise noted) landed, including customs duty, but no other taxes.

	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (⅜" Dia. incl. all extras)	$5.93	$6.18	$6.12	$5.76
Merchant Bars (¼" Round incl. all extras)...	7.05	7.29	6.65	6.28
Bands (1"x⅛"x20' incl. all extras)	7.76	7.98	7.65	7.38
Angles (2"x2"x¼" incl. all extras)	5.98	6.23	6.46	6.10
Beams & Channels (base)	6.43	6.66	6.92	6.56
Furring Channels (C.R. ¾", per 1000')	26.67	27.36	....	....
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.12	8.32	8.97	8.79
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's bright, low C, (11½ ga.)	7.15	7.29	8.29	8.29
Wire, galv., Fence qual., low C, (11½ ga.) ..	7.68	7.82	9.09	9.09
Wire, Merchant quality, bl. ann., (10 ga.) ...	7.27	7.42	8.45	8.45
Rope Wire (.045", 247,000 PSI, incl. extras)..	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14½ ASWG, 97 lbs. net)	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C, per 100')...	8.48	8.83	....	....
Casing (5½", 15.5 J55, T & C, per 100')	189.00	194.00	....	....
Tubing (2⅞", 6.4 J55, EUE, per 100')	98.00	99.00	....	....
Forged R Turn. Bars, C-1035 (from 10" dl.).	13.50	13.73	13.50	13.24

Ask prices on: Bulb tees, bolts and nuts, manganese steel plates and shapes, welded wire reinforcing mesh and hardware cloth, boiler tubes, A-335-P11 pressure pipe.

from prominent century-old West German Mills

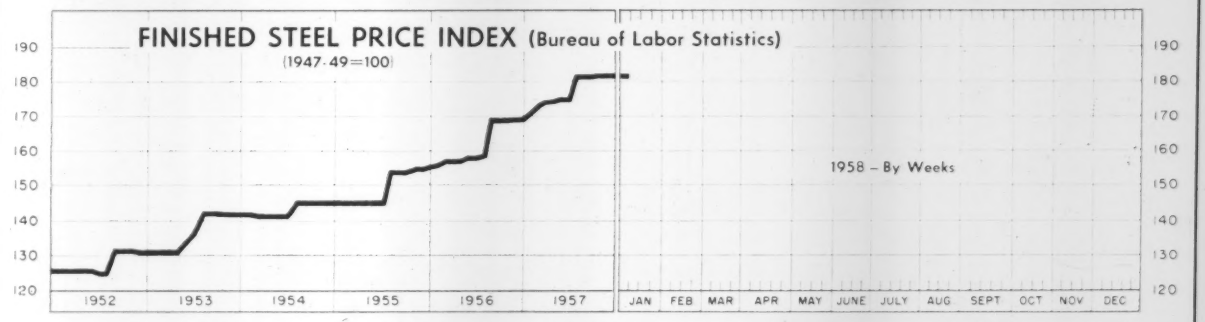
Through Stahlunion-Export GmbH

BOCHUMER VEREIN World's first Steel Foundry, 1842—Vacuum degassed Forgings. Pinion wire and spring wire for watches and clocks.
DORTMUNDER UNION Originators of Interlock Sheet Piling—Larssen Sheet Piling, Plate, Shapes, Forged Bars and Shafts.
NIEDERRHEIN Europe's most modern Rod Mill—OH, CH, Low Metalloid, Specialty Wire Rod, Merchant Bars.
WESTFAELISCHE UNION Europe's largest Wire Mill—All types drawn Wire and Wire Products—Nails, Barbwire, Wire Rope, Prestress Concrete Wire and Strand.
PHOENIX RHEINROHR Europe's largest Pipe Mill—Pipe, Tubing, Flanges, Welding Fittings, Precision Tubes, Tubular Masts.

Ask us to quote on your requirements

KURT ORBAN COMPANY, INC., 46 Exchange Place, Jersey City 2, N. J.
In Canada: Kurt Orban Canada, Ltd., Vancouver, Toronto, Montreal

Price Indexes and Composites



Jan. 7, 1958	Week Ago	Month Ago	Dec. Avg.	Year Ago
181.7	181.7	181.7	181.7	171.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 7

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.600	Bars, Reinforcing	6.210
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.535	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.650	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.355	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.245
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
		Tubes, Boiler (100 ft)	49.130
		Tubing, Mechanical, Carbon (100 ft)	24.953
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.225
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Jan. 8 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	225.92	181.31
Index in cents per lb	6.479	6.479	6.479	6.111	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$145.42	$145.42	$146.03	$137.98	$110.98
No. 2 Fdry. Pig Iron, GT	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT	33.33	33.17	32.00	60.83	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Jan. 8 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	5.365	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.545	5.31	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.10	5.25	4.35
Plates, Sparows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.70	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsbugh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.10-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.20	6.20-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.95	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, 7/32-5/8" Pitts.	6.15	6.15	6.15	5.80	4.425

PIG IRON, Gross Ton

	Jan. 8 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.01	70.01	70.01	66.38	59.25
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila.	70.51	70.51	70.51	66.88	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne	245.00†	245.00†	245.00†	235.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$32.50	$31.50	$31.50	$62.50	$44.00
No. 1 Heavy Melt, E. Pa.	37.00	37.00	33.50	61.00	41.50
No. 1 Heavy Melt, Chicago	30.50	31.00	31.00	59.00	42.50
No. 1 Heavy Melt, Valley	29.50	29.50	29.50	63.50	44.00
No. 1 Heavy Melt, Cleve.	26.50	26.50	26.50	60.50	43.00
No. 1 Heavy Melt, Buffalo	29.50	30.50	31.50	61.50	43.00
Rails, Rerolling Chicago	49.50	49.50	47.50	84.50	52.50
No. 1 Cast, Chicago	39.50	39.50	35.50	50.50	44.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.00	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.00	17.00

Steel Prices

Mill prices as reported to STEEL, Jan. 8, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 109; to footnotes, page 111.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell,Pa. S3 .....77.00
Lowellville,O. S3 .....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B3 ....77.50
Lackawanna,N.Y. B2 ..77.50
Munhall,Pa. U5 .....77.50
S.Chicago,Ill. R2, U5..77.50
S.Duquesne,Pa. U5 ...77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3..101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 .....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 .....96.00
Lackawanna,N.Y. B2...96.00
LosAngeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2, U5, W14..96.00
S.Duquesne,Pa. U5 ...96.00
S.SanFrancisco B3 ...105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$114.00
Bridgeport,Conn. C32..114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 ..121.00
Detroit S41 .....114.00
Economy,Pa. B14 .....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor,Ind. Y1 ...114.00
Johnstown,Pa. B2 .....114.00
Lackawanna,N.Y. B2 ..114.00
Los Angeles B3 .....134.00
Lowellville,O. S3 .....114.00
Massillon,O. R2 .....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2,U5,W14..114.00
S.Duquesne,Pa. U5 ...114.00
Struthers,O.Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$117.50
Buffalo R2 .....117.50
Canton,O. R2 .....120.00
Cleveland R2 .....117.50
Gary,Ind. U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ...117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 .....5.075
Munhall,Pa. U5 .....4.875
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....6.15
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 .....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P7 .....6.15
N.Tonawanda,N.Y. B11..6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill. (1) N15 ....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 .....5.275
Bessemer,Ala. T2 .....5.275
Bethlehem,Pa. B2 .....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1- 6.075
Gary,Ind. U5 .....5.275
Geneva,Utah C11 .....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ....5.275
Johnstown,Pa. B2 .....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2..5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ....5.575
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ....5.325
Portland,Oreg. O4 ....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14..5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ....5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 .....5.325
Clairton,Pa. U5 .....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2..5.275
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ....5.325
S.Chicago,Ill. U5 .....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 .....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.325
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 .....6.225
Weirton,W.Va. W6 ....6.225

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky. (15) A10..5.10
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 .....5.10
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.10
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.20
Fairfield,Ala. T2 .....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 ....5.30
Harrisburg,Pa. P4 .....5.10
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.45
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 .....5.10
Newport Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale,Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown U5, Y1 ...5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....6.75
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Johnstown,Pa. B2 .....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 .....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 .....7.625
Clairton,Pa. U5 .....7.625
Claymont,Del. C22 .....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 .....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 .....7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1 ..8.425
Gary,Ind. U5 .....7.625
Geneva,Utah C11 .....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 .....7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 .....7.20
Coatesville,Pa. L7 .....7.20
Economy,Pa. B14 .....7.20
Farrell,Pa. S3 .....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ...6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa. (9) J5 ...5.425
Alton,Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ..5.425
Buffalo(9) R2 .....5.425
Clairton,Pa. (9) U5 ....5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5 ....5.525
Emeryville,Calif. J7 ..6.175
Fairfield,Ala(9) T2 ..5.425
Fairless,Pa. (9) U5 ..5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 .....5.425
Houston (9) S5 .....5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 ....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
N.Tonawanda,N.Y.(23)B11 5.775
Pittsburg,Calif.(9) C11..6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 .....6.175
Seattle B3, N14 .....6.175
S.Ch'e'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11..6.125
Youngstown(9) R2, U5..5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 .....6.475
Bridgeport,Conn. C32 ..6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Economy,Pa. B14 .....6.475
Ecorse,Mich. G5 .....6.575
Fairless,Pa. U5 .....6.625
Farrell,Pa. S3 .....6.475
Fontana,Calif. K1 .....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 .....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 .....6.475
Waren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....7.925
Bessemer,Ala. T2 .....7.925
Bethlehem,Pa. B2 .....7.925
Clairton,Pa. U5 .....7.925
Cleveland R2 .....7.925
Ecorse,Mich. G5 .....8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 .....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 ...7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2..7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ....5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet,Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 .....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 .....6.55
Youngstown U5 .....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ...9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 .....10.10
Chicago W18 .....9.925
Cleveland C20 .....9.925
Elyria,O. W8 .....9.925
LosAngeles S30
(Grade A) 11.30
(Grade B) 11.80
LosAngeles P2 .....10.75
(Grade A) 11.46
(Grade B) 11.90
Monaca,Pa. S17 .....9.925
Newark,N.J. W18 .....10.10
SpringCity,Pa. K3 .....10.10
Warren,O. C17 .....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 .....7.90
Bridgeport,Conn. C32 ..7.65
Buffalo B5 .....7.35
Camden,N.J. P13 .....7.75
Carnegie,Pa. C12 .....7.30
Chicago W18 .....7.30
Cleveland A7, C20 .....7.30
Detroit B5, P17 .....7.50
Detroit S41 .....7.30
Donora,Pa. A7 .....7.30
Elyria,O. W8 .....7.30
FranklinPark,Ill. N5 ....7.30
Gary,Ind. B2 .....7.30
GreenBay,Wis. F7 .....7.30
Hammond,Ind. J5, L2 ..7.30
Hartford,Conn. R2 .....7.80
Harvey,Ill. B5 .....7.30
LosAngeles (49) S30 ..8.75
LosAngeles P2, R2 ....8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 .....7.30
Monaca,Pa. S17 .....7.30
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 .....7.30
Plymouth,Mich. P5 .....7.55
Putnam,Conn. W18 .....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 .....7.30
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 .....7.30
Warren,O. C17 .....7.30
Willimantic,Conn. J5 ..7.80
Waukegan,Ill. A7 .....7.30
Youngstown F3, Y1 .....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa.M12,R2 8.775
Bethlehem,Pa. B2 .....8.775
Bridgeport,Conn. C32 ..8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 .....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ..8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 .....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 .....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2 ....8.775
LosAngeles P2, S30 ....10.75
Mansfield,Mass. B5 ....9.075
Massillon,O. R2, R8 ....8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 .....8.975
S.Chicago,Ill. W14 .....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Worcester,Mass. A7 ..9.075
Youngstown F3, Y1 ..8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.425
Atlanta A11 .....5.625
Birmingham C15, S42 ..5.425
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 .....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1 5.425
Johnstown,Pa. B2 .....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 .....5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 .....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 .....5.425
S.SanFrancisco B3 .....6.175
SparrowsPoint,Md. B2 ..5.425
Sterling,Ill.(1) N15 ..5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..6.00
Torrance,Calif. C11 ...6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 .....7.08
KansasCity,Mo. S5 .....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 .....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 .....7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.325
ChicagoHts.(4)(44) I-2 .5.425
ChicagoHts.(4) C2 .....5.425
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ..5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 .....5.325
Tonawanda(3) R12 ...5.325
Tonawanda(4) B12 .....6.00
Williamsport,Pa.(3) S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 .....5.675
Gary,Ind. U5 .....4.925
Geneva,Utah C11 .....5.025
GraniteCity,Ill. (8)G4..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 .4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 .....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 .4.925
Steubenville,O. W10 ..4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R.,(19 Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ...8.10

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 .....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 .....8.025
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2 .7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ...7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ..6.05
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ...7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 .....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ...6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ...10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert	Cu Steel	Cu Fe
Ashland,Ky. A10	6.95	7.20
Canton,O. R2	6.95	7.45
Fairfield T2	6.95	7.20
Gary,Ind. U5	6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	6.95	7.20
Irvin,Pa. U5	6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	6.95	7.20
Pitts.,Calif. C11	7.70	...
Pittsburgh J5	6.95	...
SparrowsPt. B2	6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 .. 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ....6.60‡
Ashland,Ky. A10 .....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ....6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 .....6.70‡
MartinsFerry,O. W10 ...6.60*
Middletown,O. A10 ....6.60†
Pittsburg,Calif. C11 ...7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ...6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .....7.175

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ..9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ...7.425
Niles,O. (28) R2 .....7.425
Weirton,W.Va. W6 ..7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .9.25
Butler,Pa. A10 (type 2) .9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2, Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.65
Ind.Harbor,Ind. I-2 ..8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 CarpenterSteelofN.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel& Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Div., H. K. Porter Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	.4.925
Allenport,Pa. P7	.4.925
Alton,Ill. L1	.5.125
Ashland,Ky.(8) A10	.4.925
Atlanta A11	.5.125
Bessemer,Ala. T2	.4.925
Birmingham C15	.4.925
Buffalo (27) R2	.4.925
Conshohocken,Pa. A3	.4.975
Detroit M1	.5.025
Ecorse,Mich. G5	.5.025
Fairfield,Ala. T2	.4.925
Fontana,Calif. K1	.5.675
Gary,Ind. U5	.4.925
Ind.Harbor,Ind. I-2, Y1	4.925
Johnstown,Pa. (25) B2	4.925
Lackaw'na,N.Y.(25) B2	4.925
LosAngeles(25) B3	.5.675
Minnequa,Colo. C10	.6.025
Pittsburg,Calif. C11	.5.675
Riverdale,Ill. A1	.4.925
SanFrancisco S7	.6.35
Seattle(25) B3	.6.35
Seattle N14	.6.35
Sharon,Pa. S3	.4.925
S.SanFrancisco(25) B3	5.675
SparrowsPoint,Md. B2	4.925
Sterling,Ill. (1) N15	.4.925
Sterling,Ill. N15	.5.025
Torrance,Calif. C11	.5.675
Warren,O. R2	.4.925
Weirton,W.Va. W6	.4.925
Youngstown U5	.4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	.8.10
Farrell,Pa. S3	.8.10
Gary,Ind. U5	.8.10
Houston S5	.8.35
Ind.Harbor,Ind. Y1	.8.10
KansasCity,Mo. S5	.8.35
LosAngeles B3	.9.30
Lowellville,O. S3	.8.10
Newport,Ky. A2	.8.10
Sharon,Pa. A2	.8.10
S.Chicago,Ill. W14	.8.10
Youngstown U5, Y1	.8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	.7.325
Conshohocken,Pa. A3	.7.325
Ecorse,Mich. G5	.7.425
Fairfield,Ala. T2	.7.325
Farrell,Pa. S3	.7.325
Gary,Ind. U5	.7.325
Ind.Harbor,Ind. I-2, Y1	7.325
Lackawanna,N.Y. B2	.7.325
LosAngeles(25) B3	.8.075
Seattle(25) B3	.8.325
Sharon,Pa. S3	.7.325
S.Chicago,Ill. W14	.7.325
S.SanFrancisco(25)B3	.8.075
SparrowsPoint,Md. B2	.7.325
Warren,O. R2	.7.325
Weirton,W.Va. W6	.7.325
Youngstown U5, Y1	.7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	.5.175
Warren,O. R2	.5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	.7.15
Baltimore T6	.7.15
Boston T6	.7.70
Buffalo S40	.7.15
Cleveland A7, J5	.7.15
Conshohocken,Pa. A3	.7.20
Dearborn,Mich. D3	.7.25
Detroit D2, M1, P20	.7.25
Dover,O. G6	.7.15
Ecorse,Mich. G5	.7.25
Evanston,Ill. M22	.7.25
Follansbee,W.Va. F4	.7.15
Fontana,Calif. K1	.9.00
FranklinPark,Ill. T6	.7.25
Ind.Harbor,Ind. Y1	.7.15
Indianapolis J5	.7.30
LosAngeles J5	.9.05
LosAngeles C1	.9.20
NewBedford,Mass. R10	.7.60
NewBritain(10) S15	.7.15
NewCastle,Pa. B4, E5	.7.15
NewHaven,Conn. D2	.7.60
NewKensington,Pa. A6	.7.15
Pawtucket,R.I. R3	.7.80
Pawtucket,R.I. N8	.7.70
Philadelphia(45) P24	.7.70
Pittsburgh J5	.7.15
Riverdale,Ill. A1	.7.25
Rome,N.Y. (32) R6	.7.15
Sharon,Pa. S3	.7.15
Trenton,N.J. (31) R5	.8.60
Wallingford,Conn. W2	.7.60
Warren,O. R2, T5	.7.15
Weirton,W.Va. W6	.7.15
Worcester,Mass. A7	.7.70
Youngstown J5, Y1	.7.15

STRIP, Cold-Rolled Alloy

Boston T6	.15.40
Carnegie,Pa. S18	.15.05
Cleveland A7	.15.05
Dover,O. G6	.15.05
Farrell,Pa. S3	.15.05
FranklinPark,Ill. T6	.15.05
Harrison,N.J. C18	.15.05
Indianapolis J5	.15.20
Lowellville,O. S3	.15.05
Pawtucket,R.I. N8	.15.40
Riverdale,Ill. A1	.15.05
Sharon,Pa. S3	.15.05
Worcester,Mass. A7	.15.35
Youngstown J5	.15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	.10.45
Dearborn,Mich. D3	.10.60
Dover,O. G6	.10.45
Ecorse,Mich. G5	.10.55
Farrell,Pa. S3	.10.50
Ind.Harbor,Ind. Y1	.10.65
Sharon,Pa. S3	.10.50
Warren,O. R2	.10.45
Weirton,W.Va. W6	.10.50
Youngstown Y1	.10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	.7.90

STRIP, C.R. Electrogalvanized

Cleveland A7	.7.15*
Dover,O. G6	.7.15*
Evanston,Ill. M22	.7.25*
Riverdale,Ill. A1	.7.25*
Warren,O. B9, T5	.7.15*
Worcester,Mass. A7	.7.70*
Youngstown J5	.7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	.7.275

TIGHT COOPERAGE HOOP

Atlanta A11	.5.65
Riverdale,Ill. A1	.5.50
Sharon,Pa. S3	.5.35
Youngstown U5	.5.35

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
Fostoria,O. S1	10.05	11.15	13.10	16.10	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
Los Angeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.60C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.10	21.95	26.30
Buffalo W12	18.10	....	....
Fostoria,O. S1	18.30	22.15	....
FranklinPark,Ill. T6	18.45	22.30	26.65
Harrison,N.J. C18	18.10	21.95	26.30
NewYork W3	18.10	21.95	26.30
Palmer,Mass. W12	18.10	....	....
Trenton N.J. R5	18.10	21.95	26.30
Worcester,Mass. A7, T6	18.10	21.95	26.30
Youngstown J5	18.45	22.30	26.65

SILICON STEEL

H.R.SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP Coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.15	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10(FP Coils)	....	11.35	12.05	13.15	14.20

H.R. SHEETS (22Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	....
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif. K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va. W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2,Y1	7.85
Irvin,Pa. U5	7.85
Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	.7.65
Aliquippa,Pa. J5	.7.65
Alton,Ill. L1	.7.85
Atlanta A11	.7.85
Bartonville,Ill. K4	.7.75
Buffalo W12	.7.65
Chicago W13	.7.65
Cleveland A7, C20	.7.65
Crawfordsville,Ind. MS	.7.75
Donora,Pa. A7	.7.65
Duluth A7	.7.65
Fairfield,Ala. T2	.7.65
Fostoria,O.(24) S1	.7.75
Houston S5	.7.90
Jacksonville,Fla. MS	.8.00
Johnstown,Pa. B2	.7.65
Joliet,Ill A7	.7.65
KansasCity,Mo. S5	.7.90
Kokomo,Ind. C16	.7.75
LosAngeles B3	.8.60
Minnequa,Colo. C10	.7.90
Monessen,Pa. P7, P16	.7.65
N.Tonawanda,N.Y. B11	.7.65
Palmer,Mass. W12	.7.95
Pittsburg,Calif. C11	.8.60
Portsmouth,O. P12	.7.65
Rankin,Pa. A7	.7.65
S.Chicago,Ill. R2	.7.65
S.SanFrancisco C10	.8.60
SparrowsPoint,Md. B2	.7.75
Sterling,Ill.(1) N15	.7.65
Sterling,Ill. N15	.7.75
Struthers,O. Y1	.7.65
Waukegan,Ill. A7	.7.65
Worcester,Mass. A7	.7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	.12.65
Buffalo W12	.12.65
Cleveland A7	.12.65
Donora,Pa. A7	.12.65
Duluth A7	.12.65
Johnstown,Pa. B2	.12.65
Minnequa,Colo. C10	.12.775
Monessen,Pa. P16	.12.65
Muncie,Ind. I-7	.12.85
NewHaven,Conn. A7	.12.95
Palmer,Mass. W12	.12.95
Pittsburg,Calif. C11	.13.45
Portsmouth,O. P12	.12.65
Roebling,N.J. R5	.12.95
SparrowsPt.,Md. B2	.12.75
Struthers,O. Y1	.12.65
Trenton,N.J. A7	.12.95
Waukegan,Ill. A7	.12.65
Worcester,Mass. A7	.12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	.9.30
Alton,Ill. L1	.9.50
Buffalo W12	.9.30
Cleveland A7	.9.30
Donora,Pa. A7	.9.30
Duluth A7	.9.30
Johnstown,Pa. B2	.9.30
KansasCity,Mo. S5	.9.55
LosAngeles B3	.10.25
Minnequa,Colo. C10	.9.50
Monessen,Pa. P7, P16	.9.30
NewHaven,Conn. A7	.9.60
Palmer,Mass. W12	.9.60
Pittsburg,Calif. C11	.10.25
Portsmouth,O. P12	.9.30
Roebling,N.J. R5	.9.60
S.Chicago,Ill. R2	.9.30
S.SanFrancisco C10	.10.25
SparrowsPt.,Md. B2	.9.40
Struthers,O. Y1	.9.30
Trenton,N.J. A7	.9.60
Waukegan,Ill. A7	.9.30
Worcester,Mass. A7, J4, T6	.9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	.15.80
Bartonville,Ill. K4	.15.70
Buffalo W12	.15.60
Chicago W13	.15.60
Cleveland A7	.15.60
Crawfordsville,Ind. MS	15.70
Fostoria,O. S1	.15.60
Houston S5	.15.85
Jacksonville,Fla. MS	.15.95
Johnstown,Pa. B2	.15.60
KansasCity,Mo. S5	.15.85
Kokomo,Ind. C16	.15.60
Minnequa,Colo. C10	.15.85
Monessen,Pa. P7, P16	.15.60
Muncie,Ind. I-7	.15.80
Palmer,Mass. W12	.15.90
S.SanFrancisco C10	.16.45
Waukegan,Ill A7	.15.60
Worcester,Mass. A7, T6	15.90

ROPE WIRE

Bartonville,Ill. K4	.12.75
Buffalo W12	.12.75
Fostoria,O. S1	.12.75
Johnstown,Pa. B2	.12.75
Monessen,Pa. P7	.12.75
Muncie,Ind. I-7	.12.95
Palmer,Mass. W12	.13.05
Portsmouth,O. P12	.12.75
Roebling,N.J. R5	.13.05
SparrowsPt.,Md. B2	.12.85
Struthers,O. Y1	.12.75
Worcester,Mass. J4	.13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	....16.55
Monessen,Pa. P16	....16.55
Roebling,N.J. R5	....17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	....11.65
Baltimore T6	.....11.95
Boston T6	.....11.95
Buffalo W12	.....11.65
Chicago W13	.....11.75
Cleveland A7	.....11.65
Crawfordsville,Ind. MS	..11.65
Dover,O. G6	.....11.65
Fostoria,O. S1	.....11.65
FranklinPark,Ill. T6	..11.75
Kokomo,Ind. C16	....11.65
Massillon,O. R8	.....11.65
Milwaukee C23	.....11.85
Monessen,Pa. P7, P16	..11.65
Palmer,Mass. W12	....11.95
Pawtucket,R.I. N8	....11.95
Philadelphia P24	.....11.95
Riverdale,Ill. A1	.....11.75
Rome,N.Y. R6	.....11.65
Sharon,Pa. S3	.....11.65
Trenton,N.J. R5	.....11.95
Warren,O. B9	.....11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock — **Col.**

AlabamaCity,Ala. R2	..173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville, Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. MS	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla.(20) MS	.181
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	....$9.10

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	..$9.80
Wheeling,W.Va. W10	...9.80

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	...175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind MS	..177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) MS	186
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
Kokomo,Ind. C6	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	.$10.26
Atlanta A11	.....10.36
Bartonville,Ill. K4	....10.36
Buffalo W12	.....10.26
Chicago W13	.....10.26
Crawfordsville,Ind. MS	.10.36
Donora,Pa. A7	.....10.26
Duluth A7	.....10.26
Fairfield,Ala T2	.....10.26
Houston S5	.....10.51
Jacksonville,Fla. MS	...10.82
Johnstown,Pa. B2	....10.26
Joliet,Ill. A7	.....10.26
KansasCity,Mo. S5	....10.51
Kokomo,Ind. C16	....10.36
LosAngeles B3	.....11.05
Minnequa,Colo. C10	...10.51
Pittsburg,Calif. C11	...11.04
S.Chicago,Ill. R2	.....10.26
S.SanFrancisco C10	...11.04
SparrowsPt.,Md. B2	...10.36
Sterling,Ill.(37) N15	...10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	.$10.60
Atlanta A11	.....10.70
Bartonville,Ill. K4	....10.70
Buffalo W12	.....10.60
Chicago W13	.....10.60
Crawfordsville,Ind. MS	.10.70
Donora,Pa. A7	.....10.60
Duluth A7	.....10.60
Fairfield,Ala T2	.....10.60
Houston S5	.....10.85
Jacksonville,Fla. MS	..11.16
Johnstown,Pa. B2	....10.60
Joliet,Ill. A7	.....10.60
KansasCity,Mo. S5	....10.85
Kokomo,Ind. C16	....10.70
LosAngeles B3	.....11.40
Minnequa,Colo. C10	...10.85
Pittsburg,Calif. C11	...11.40
S.Chicago,Ill. R2	.....10.60
S. SanFrancisco C10	...11.40
SparrowsPt., Md. B2	...10.70
Sterling,Ill.(37) N15	...10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	..$10.65
Atlanta A11	.....10.75
Bartonville,Ill. K4	....10.75
Buffalo W12	.....10.65
Chicago W13	.....10.65
Crawfordsville,Ind. MS	.10.75
Donora,Pa. A7	.....10.65
Duluth A7	.....10.65
Fairfield,Ala. T2	.....10.65
Houston S5	.....10.90
Jacksonville,Fla. MS	..11.21
Johnstown,Pa. B2	....10.65
Joliet,Ill. A7	.....10.65
KansasCity,Mo. S5	....10.90
Kokomo,Ind. C16	....10.75
LosAngeles B3	.....11.45
Minnequa,Colo. C10	...10.90
Pittsburg,Calif. C11	...11.45
S.Chicago,Ill. R2	.....10.65
S.SanFrancisco C10	...11.45
SparrowsPt.,Md. B2	...10.75
Sterling,Ill(37) N15	...10.75

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	..212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. MS	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. MS	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg, Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md B2	214
Sterling,Ill.(7) N15	214
Williamsport,Pa. S19	175

FENCE POSTS

Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	..172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	..171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	..174

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	..193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. MS	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198**
Jacksonville,Fla. MS	203
Johnstown,Pa. B2	....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	....198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	....198**
Monessen,Pa. P7	.....196*
Pittsburg,Calif. C11	....213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
S.SanFrancisco C10	...213**
SparrowsPoint,Md. B2	..198§
Sterling,Ill.(7) N15	....198§

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	....187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	.....192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. MS	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192**
Jacksonville,Fla. MS	197
Johnstown,Pa.(43) B2	..190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	....192**
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	...192**
Pittsburg,Calif. C11	....210†
Rankin,Pa. A7	.....187†
S.Chicago,Ill. R2	.....187**
Sterling,Ill.(7) N15	....192§

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	.17.15	18.95
Bartonville K4	..17.25	19.05
Cleveland A7	...17.15	....
Crawf'dsville MS	17.25	19.05
Fostoria,O. S1	..17.65	19.20†
Houston S5	... 17.40	18.95**
Jacksonville MS	.17.50	19.30
Johnstown B2	..17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	..17.25	18.80†
Minnequa C10	..17.40	18.95**
P'lm'r,Mass.W12	17.45	19.00†
Pitts.,Calif. C11	.17.50	19.05†
SparrowsPt. B2	.17.25	19.05§
Sterling(37)N15	.17.25	19.05§
Waukegan A7	..17.15	18.70†
Worcester A7	..17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	8.65 9.20**
Aliquippa J5	....8.65 9.325§
Atlanta(48) A11	..8.75 9.425*
Bartonville(48) K4	8.75 9.425
Buffalo W12	....8.65 9.20†
Cleveland A7	....8.65 ....
Crawfordsville MS	8.75 9.425
Donora,Pa. A7	..8.65 9.20†
Duluth A7	.....8.65 9.20†
Fairfield T2	....8.65 9.20†
Houston(48) S5	8.90 9.45**
Jacks'ville,Fla. MS	9.00 9.675
Johnstown B2(48)	8.65 9.325§
Joliet,Ill. A7	....8.65 9.20†
Kans.City(48) S5	8.90 9.45**
Kokomo C16	....8.75 9.30†
LosAngeles B3	..9.60 10.275§
Minnequa C10	..8.90 9.45**
Monessen P7(48)	..8.65 9.25*
Palmer,Mass. W12	8.95 9.50†
Pitts.,Calif. C11	..9.60 10.15†
Rankin,Pa. A7	..8.65 9.20†
S.Chicago B2	..8.65 9.20**
S.SanFran. C10	..9.60 10.15**
Spar'wsPt.B2(48)	8.75 9.425§
Sterling(48) N15	..8.90 9.575§
Sterling(1)(48)	..8.80 9.475§
Struthers,O.(48)Y1	8.65 9.30†
Worcester,Mass.A7	8.95 9.50†

Based on zinc price of: *13.50, †5c, §10c, ‡Less than 10c, ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)	
½ in. and smaller:	
6 in. and shorter....	49.0
Longer than 6 in. ..	39.0
⅝ in. thru 1 in.:	
6 in. and shorter...	39.0
Longer than 6 in. ..	35.0
1⅛ in. and larger:	
All lengths	35.0
Undersized Body (rolled thread)	
½ in. and smaller:	
6 in. and shorter..	49.0

Carriage, Machine, Lag Bolts

Hot Galvanized:

½ in. and smaller:	
6 in. and shorter..	29.0
Longer than 6 in. ..	15.0
⅝ in. and larger:	
All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter..	49.0
Longer than 6 in. ..	39.0

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	49.0
Larger than ½ in. or Longer than 6 in. ..	39.0
Blank Bolts	39.0
Step, Elevator, Tire Bolts	49.0

Stove Bolts, Slotted:

⅛ to ⅜ in. incl., 3 in. and shorter.	55.0
⅛ to ½ in., inclusive	55.0

NUTS

Reg. & Heavy Square Nuts:

All sizes	55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller..	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger..	53.5

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller..	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger..	53.5

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller..	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller..	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger..	53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller..	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger..	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller..	60.5
¾ in. to 1 in., incl.	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger..	53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅝ in. and smaller..	40.0
¾ in. and 1 in. diam.	22.0

Longer than 6 in.:

⅝ in. and smaller..	8.0
¾, ⅞, and 1 in. diam.	+6.0

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller..	26.0
¾, ⅞, and 1 in. diam.	3.0

Longer than 6 in.:

⅝ in. and smaller..	+13.0
¾, ⅞, and 1 in. diam.	+32.0

Flat Head Capscrews:

¾ in. and smaller..	+76.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:

6 in. and shorter..	Net
Longer than 6 in...	+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.25
⅞ in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	31.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2½	12	46.99	55.06	41.81
2¾	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	....(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	.....6.60
Gary,Ind. U5	.....6.60
Ind.Harbor,Ind. I-2	....6.60
Lackawanna,N.Y. B2	..6.60
Minnequa,Colo. C10	...6.60
Seattle B3	.....6.75
Steelton,Pa. B2	.....6.60
Torrance,Calif. C11	....6.75

JOINT BARS

Bessemer,Pa. U5	.....6.975
Fairfield,Ala. T2	.....6.975
Ind.Harbor,Ind. I-2	...6.975
Joliet,Ill. U5	.....6.975
Lackawanna,N.Y. B2	..6.975
Minnequa,Colo. C10	...6.975
Steelton,Pa. B2	.....6.975

AXLES

Ind.Harbor,Ind. S13	...8.775
Johnstown,Pa. B2	....8.775

TRACK BOLTS, Untreated

Cleveland R2	.....14.75
KansasCity,Mo. S5	....14.75
Lebanon,Pa. B2	.....14.75
Minnequa,Colo. C10	...14.75
Pittsburgh P14	.....14.75
Seattle B3	.....15.25

SCREW SPIKES

Lebanon,Pa. B2	.....14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	....9.75
Lebanon,Pa. B2	.....9.75
Minnequa,Colo. C10	....9.75
Pittsburgh J5	.....9.75
Seattle B3	.....10.25
S.Chicago,Ill. R2	.....9.75
Struthers,O. Y1	.....9.75
Youngstown R2	.....9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; and 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) 3/8" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bundled.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(48) 6-7Ga.
(49) 3½ in. and smaller rounds; 9.30c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	+8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East. St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	106.75	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates: 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr-Hot Work	0.475
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.520
Oil Hardening	0.475	Hi-Carbon-Cr	0.925

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.285
18.25	4.25	1	4.75	....	2.500
18	4	2	9	....	2.870
18	4	2	....	....	1.960
18	4	1	....	....	1.795
9	3.5	..	....	....	1.395
13.5	4	3	....	....	2.060
13.75	3.75	2	5	....	2.440
6.4	4.5	1.9	....	5	1.300
6	4	3	....	6	1.545
1.5	4	1	....	8.5	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Here's the way to MODERNIZE your Forge Shop

Economically · Quickly

Put CECO-DROP *upperworks on your board drop anvils—*

For quick modernization at a minimum cost, investigate the possibility of fitting Ceco-Drop upperworks to your present board drop anvils and foundations.

You can have the benefit of all the advantages and exclusive features of the Ceco-Drop without being involved in the time and expense of replacing the anvil or disturbing the foundation.

With the Ceco-Drop upperworks, you'll have improved production rates, economies in operation and operator satisfaction that will well repay the investment.

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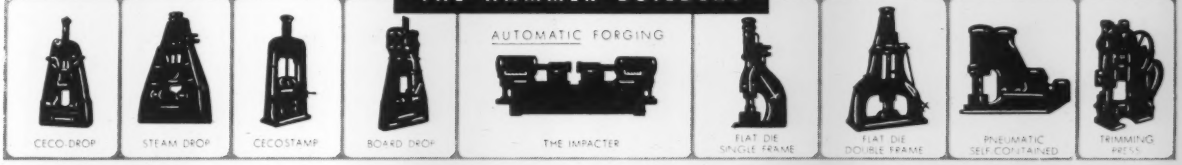

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon,Mich., deld.	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.10	75.60	....
Newark,N.J., deld.	72.29	72.79	73.29	73.79
Philadelphia, deld.	70.01	70.51	71.01	71.59
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.27
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.61	....	8.76	9.06	11.34 #	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90 #	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	55.98	8.50	8.80	10.90 #	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.00	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	52.43	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	52.33	8.33	8.69	10.80 #	14.74	**9.01**	**8.79**	**10.11**
Dallas	8.85	10.15	....	....	9.00	8.95	11.01	....	9.00	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	8.55	11.10	....	8.60	9.05	10.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	7.85	10.75	11.65	57.60	7.80	7.95	12.00	....	7.85	7.80	9.95
Memphis, Tenn.	8.55	9.80	....	....	8.60	8.97	11.96 #	....	9.01	8.93	10.56
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08[3]	9.31	9.57	12.76 #	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.69	8.65	11.51 #	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	52.00	8.33	8.60	10.80 #	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.50	15.95	8.65	8.30	11.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	9.45	9.70	13.00	16.10	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.00	57.38	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.88	....	....	....	9.36	9.56	10.94	....	9.79	9.26	10.74

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [8]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

typical large drill bit

Surface metal is cut away to shape drill point and spiral flutes — core is exposed to wear, structural loads

point and cutting lips are critical to drill performance. If alloy has any weakness at center, poor cutting or broken drill will result. Mel-Trol eliminates this trouble by insuring uniform strength and toughness from surface core. Never before have commercially available alloys been so completely free of segregation, porosity and centerline weakness.

MEL-TROL ...solves a major metalworking problem—poor centerline quality in alloys

The more surface metal you cut away from an alloy steel bar, the more important uniform core quality becomes. The drill illustration above shows you why.

In alloy steels made by conventional steelmaking process, segregation, porosity or other inhomogeneities are often found along the centerline. Result: the core metal lacks the toughness of the rest of the bar, even though it may show no detectable variation.

To alleviate this major cause of poor tool quality, poor tool life and excessive rejects, Carpenter metallurgists developed the Mel-Trol process. Now, for the first time, alloys with complete uniformity from surface to centerline are being made in quantity.

The Mel-Trol process produces freedom from segregation, porosity and centerline weakness through a system of quality controls which play a part in every phase of the entire steelmaking process. Equipment developed specifically for Carpenter is used together with the most modern standard quality control tools. Every piece of equipment is used to its highest accuracy—nothing less.

Mel-Trol alloys are now available at Carpenter mill-branch warehouses. Ask about them the next time a Carpenter representative calls on you. He'll show you how you can join the growing number of companies who are finding Mel-Trol alloys the answer to a host of metalworking problems.

Carpenter STEEL

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Pioneering in improved specialty steels through continuing research

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $33-34; Mexican, all rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over.. F.o.b. Riverton or Camden, N. J., west of Mississippi River.	10.50 9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over F.o.b. Riverton, N. J., west of Mississippi River	10.50 9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade. 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500 lb drum, freight allowed Carlots	39.50
Ton lots	41.50
Antimony, 500 lb lots	42.00*
Brass, 5000-lb lots	31.30-38.40†
Bronze, 5000-lb lots	48.10-52.70†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	49.20-61.30†
Phosphor-Copper, 5000-lb lots	59.80
Copper (atomized) 5000-lb lots	40.30-48.80‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.02
Stainless Steel, 316	$1.20
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡
Tungsten: Melting grade, 99% 60 to 200 mesh:	Dollars
1000 lb and over..	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.68	$5.63	$5.68	$5.93
Bar Size Angles	5.98	5.93	5.98	6.23
Structural Angles	5.98	5.93	5.98	6.23
I-Beams	6.43	6.39	6.43	6.68
Channels	6.43	6.39	6.43	6.68
Plates (basic bessemer)	7.64	7.59	7.64	7.88
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.37	6.32	6.37	6.61
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (§)	8.12	8.12	8.12	8.32

†Per 82 lb. net, reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	28.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$13.00-14.00*
Domestic, concentrates f.o.b. milling points	20.00-22.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.39-1.42 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$51.00-53.00
48% 2.8:1	48.00-50.00
48% no ratio	41.00-43.00

South African Transvaal

48% no ratio	$40.00-41.00
44% no ratio	30.00-30.50

Turkish

48% 3:1	$55.00-57.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.60
60-65%	2.60-2.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50
Oven Foundry Coke	
Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00
Per ton, bulk, ovens	
Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.

NOTHING **TRANSMITS POWER** AT SUCH LOW COST FOR **SO LONG** AS ROEBLING ROYAL BLUE WIRE ROPE. No means of transmitting power can be compared—on a cost basis—with Royal Blue, the strongest wire rope you've ever used. Meeting industry's stringent service demands is a function fulfilled by Royal Blue in many ways: unimpaired flexibility, great resistance to shock, abrasion and corrosion . . . a plurality of qualities that make for singularly long service life. For further details on "length through strength," communicate with Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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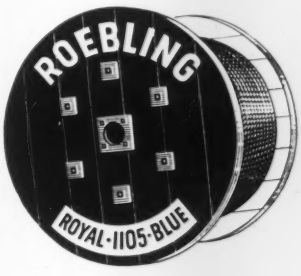

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MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton. Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton: $245, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively. (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium: for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2% from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38.43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67.71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 5% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35%-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c, per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l., bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c. 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c; (Small size—weighing approx 2½ lb and containing 1 lb of Si.) Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l., bags, 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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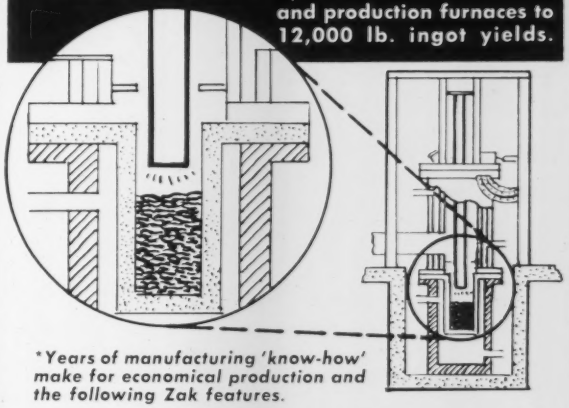

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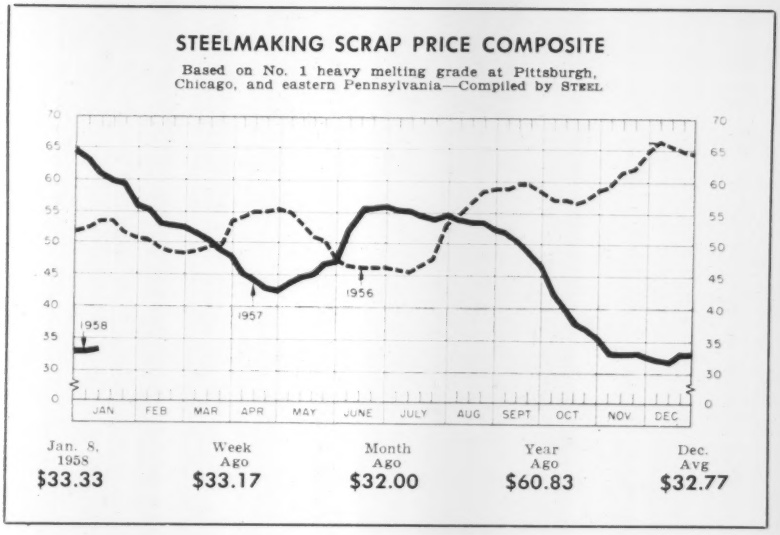


Scrap Develops Firmer Price Tone

STEEL's index on the prime steelmaking grade advances 16 cents to $33.33. Rise is largely psychological as demand from the mills and foundries still lags

Scrap Prices, Page 122

Philadelphia—Light sales of No. 2 heavy melting steel have lifted the price to $34, up $1.50 a ton. At $37, the movement of No. 1 heavy melting involves only small tonnages. The only decline in the list is on rail crops at $61-$63. Heavy breakable cast is $2 higher at $39.

Tonnage is not coming out freely for domestic shipment at current prices. Buying for export is at prices closer to domestic delivered quotations.

New York—Brokers are paying $34.50 for No. 1 heavy melting scrap, although the $33.50 price has not been eliminated. Heavy breakable cast is slightly easier. Buying activity is largely for export, but it is not brisk, and is at prices about $2 over the domestic market level.

Pittsburgh—Slightly higher industrial lists and moderate gains in railroad lists have revived the market here. In addition, a mill on the fringe of the district bought No. 1 heavy melting scrap at $1 above its previous purchase in December.

Brokers note an improvement in "market feeling," although they admit the better tone is largely psychological.

On the latest lists, No. 1 railroad heavy melting scrap gained 50 cents a ton to $36.50-$37.50. Rails went up $1. No. 1 factory bundles sold for $36, up $1. Turnings and borings are up $2 a ton.

Cleveland—Several Valley mills purchased No. 1 industrial bundles within the past week or so, paying $35 delivered their plants. This is equivalent to about $31-$32, in the Cleveland market. The purchases have served to put a little stronger tone into the market despite continued lack of buying in dealer scrap.

The price on cut foundry steel is off $1 a ton to $32-$33, but cut structurals are up $1, and a number of foundry grades are quoted $2 higher. Railroad items also are $1 to $2 a ton higher.

Cincinnati—The scrap market is in a sidewise movement. Two area mills entered the market for the first time in the new year, and prices on some grades advanced while others declined. No. 2 bundles moved up $2 to $21-$22, brokers' buying price. Turnings moved down $1 to $2 a ton. Several cast grades advanced $2 a ton.

Chicago — Steelmaking scrap is slightly weaker than it was, but foundry scrap has edged up to what may be its top price for awhile. The slow steelmaking rate, which does not promise to pick up a lot in the near future, explains what is happening in the steelmaking scrap grades.

Scrap brokers and dealers are concerned about the 40-cent per gross ton freight rate increase railroads are proposing. Scrapmen say it would amount to a 20 per cent boost in the Chicago switching district.

Buffalo—Scrap prices have declined another $1 in this market due to the continued absence of buying. All grades, except cast, were affected by the price reduction.

Detroit—The scrap market here is weak, and little activity is expected this month. One large broker purchased most of the Fisher Body, Chrysler, and Cadillac scrap when the lists were closed at the end of last year. The scrap still is on the ground.

Birmingham — There is little movement of scrap here. Open-hearth consumers are out of the market. A few sales of foundry and electric furnace grades indicate a firmer market, but brokers have not changed their quotations.

San Francisco — Steel scrap prices have fallen $2 to $4 a ton to the lowest level since late 1954. There is little activity in the market, and it is doubtful if the reduced prices are firm.

Los Angeles—Dealers report a slight increase in buyer interest. Prices continue soft, some items being off $1 to $2 a ton.

Seattle—The local scrap market registered an average price decline of about $4 a ton over the holidays. There were few sales in the period.

Toronto, Ont. — Canadian scrap prices are off $2 a ton, delivered Hamilton, Ont., mills. The new prices bring No. 1 heavy melting down to $32. Other grades show comparable declines.

The Department of Trade & Commerce says the scrap situation is unchanged. In the first quarter the policy of issuing permits against applications for export from west coast areas will continue.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Jan. 8, 1958. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Jan. 8	$33.33
Dec. 31	33.17
Dec. Avg.	32.77
Jan. 1957	58.96
Jan. 1953	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	29.00-30.00
No. 1 factory bundles	*35.00-36.00*
No. 1 dealer bundles	*32.00-33.00*
No. 2 bundles	28.00-29.00
No. 1 busheling	*32.00-33.00*
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*21.00-22.00*
Cast iron borings	*21.00-22.00*
Cut structurals:	
2 ft and under	*36.00-37.00*
3 ft lengths	*35.00-36.00*
Heavy turnings	*31.00-32.00*
Punchings & plate scrap	*35.00-36.00*
Electric furnace bundles	*35.00-36.00*

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	33.00-34.00
Unstripped motor blocks	26.00-27.00
Clean auto cast	42.00-43.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.50-37.50*
Rails, 2 ft and under	*57.00-58.00*
Rails, 18 in. and under	*58.00-59.00*
Angles, splice bars	*48.00-49.00*
Rails, rerolling	*58.00-59.00*

Stainless Steel Scrap

18-8 bundles & solids	*195.00-200.00*
18-8 turnings	*95.00-100.00*
430 bundles & solids	95.00-100.00
430 turnings	50.00-55.00

CLEVELAND

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	20.00-21.00
No. 1 factory bundles	*31.00-32.00*
No. 1 bundles	26.00-27.00
No. 2 bundles	19.00-20.00
No. 1 busheling	26.00-27.00
Machine shop turnings	11.00-12.00
Short shovel turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut foundry steel	*32.00-33.00*
Cut structurals, plates 2 ft and under	*36.00-37.00*
Low phos. punchings & plate	29.00-30.00
Alloy free, short shovel turnings	19.00-20.00
Electric furnace bundles	27.00-28.00

Cast Iron Grades

No. 1 cupola	*40.00-41.00*
Charging box cast	33.00-34.00
Heavy breakable cast	*31.00-32.00*
Stove plate	*38.00-39.00*
Unstripped motor blocks	23.00-24.00
Brake shoes	30.00-31.00
Clean auto cast	42.00-43.00
Burnt cast	28.00-29.00
Drop broken machinery	*42.00-43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*32.50-33.50*
R.R. malleable	*44.00-45.00*
Rails, 2 ft and under	55.00-56.00
Rails, 18 in. and under	56.00-57.00
Rails, random lengths	48.00-49.00
Cast steel	*45.00-46.00*
Railroad specialties	*45.00-46.00*
Uncut tires	*39.00-40.00*
Angles, splice bars	*45.00-46.00*
Rails, rerolling	54.00-55.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*160.00-165.00*
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	29.00-30.00
No. 2 bundles	22.00-23.00
No. 1 busheling	29.00-30.00
Machine shop turnings	13.00-14.00
Short shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	33.00-34.00
Electric furnace bundles	33.00-34.00

Railroad Scrap

No. 1 R.R. heavy melt.	*35.50-36.50*

CHICAGO

No. 1 heavy melt., indus.	*31.00-32.00*
No. 1 hvy melt., dealer	29.00-30.00
No. 2 heavy melting	28.00-29.00
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles	30.00-31.00
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	32.00-33.00
No. 1 busheling, dealer	29.00-30.00
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*18.00-19.00*
Short shovel turnings	*18.00-19.00*
Cast iron borings	*18.00-19.00*
Cut structurals, 3 ft	41.00-42.00
Punchings & plate scrap	42.00-43.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	*35.00-36.00*
Unstripped motor blocks	*31.00-32.00*
Clean auto cast	44.00-45.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
R.R. malleable	48.00-49.00
Rails, 2 ft and under	*53.00-54.00*
Rails, 18 in. and under	*54.00-55.00*
Angles, splice bars	*49.00-50.00*
Axles	49.00-50.00
Rails, rerolling	49.00-50.00

Stainless Steel Scrap

18-8 bundles & solids	190.00-200.00
18-8 turnings	90.00-100.00
430 bundles & solids	80.00-90.00
430 turnings	*47.50-52.50*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*21.00-22.00*
No. 2 heavy melting	*17.00-18.00*
No. 1 bundles	*21.00-22.00*
No. 2 bundles	*17.00-18.00*
No. 1 busheling	*21.00-22.00*
Machine shop turnings	8.00-9.00
Mixed borings, turnings	9.00-10.00
Short shovel turnings	10.00-11.00
Punchings & plate scrap	*27.00-28.00*

Cast Iron Grades

No. 1 cupola	30.00
Stove plate	24.00
Charging box cast	24.00
Heavy breakable	24.00
Unstripped motor blocks	15.00
Clean auto cast	*32.00*
Malleable	33.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	32.00
No. 2 bundles	22.00†
No. 1 busheling	32.00
Machine shop turnings	15.00
Short shovel turnings	17.00

Cast Iron Grades

No. 1 cupola	42.00
Charging box cast	32.00
Heavy breakable cast	32.00
Unstripped motor blocks	32.00
Clean auto cast	44.00
Stove plate	37.00

Railroad Scrap

No. 1 R.R. heavy melt.	*34.50*
Rails, 18 in. and under	46.00
Rails, random lengths	*43.25*
Rails, rerolling	*48.00*
Angles, splice bars	41.00

†Nominal

PHILADELPHIA

No. 1 heavy melting	37.00
No. 2 heavy melting	*34.00*
No. 1 bundles	37.00
No. 2 bundles	27.00
No. 1 busheling	37.00
Electric furnace bundles	37.00
Mixed borings, turnings	22.50
Short shovel turnings	24.00
Machine shop turnings	22.00
Heavy turnings	31.00
Structurals & plate	40.00-41.00
Couplers, springs, wheels	46.00
Rail crops, 2 ft & under	*61.00-63.00*

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	*39.00*
Malleable	56.00
Drop broken machinery	49.00-50.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*33.50-34.50*
No. 2 heavy melting	29.00-30.00
No. 1 bundles	33.50
No. 2 bundles	21.00-22.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	12.00-13.00
Short shovel turnings	14.00-15.00
Low phos. (structurals & plate)	45.00-46.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	32.00
Heavy breakable	*32.00-33.00*

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	55.00-60.00
410 sheets, clips, solids	60.00-65.00
430 sheets, clips, solids	75.00-80.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	20.00-21.00
No. 1 bundles	23.00-24.00
No. 2 bundles	15.00-16.00
No. 1 busheling	22.00-23.00
Machine shop turnings	9.50-10.00
Mixed borings, turnings	10.50-11.00
Short shovel turnings	11.00-11.50
No. 1 cast	29.00-30.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	35.00-36.00

BUFFALO

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*29.00-30.00*
Mixed borings, turnings	*15.00-16.00*
Machine shop turnings	*14.00-15.00*
Short shovel turnings	17.00-18.00
Cast iron borings	*15.00-16.00*
Low phos.	*34.00-35.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupol	36.00-37.00
No. 1 machinery	41.00-42.00

Railroad Scrap

Rails, random lengths	*41.00-42.00*
Rails, 3 ft and under	*48.00-49.00*
Railroad specialties	*34.00-35.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	28.00-29.00
No. 2 bundles	*21.00-22.00*
No. 1 busheling	28.00-29.00
Machine shop turnings	*13.00-14.00*
Mixed borings, turnings	*15.00-16.00*
Short shovel turnings	16.00-17.00
Cast iron borings	*15.00-16.00*
Low phos. 18 in.	36.00-37.00

Cast Iron Grades

No. 1 cupola	*37.00-38.00*
Heavy breakable cast	*33.00-34.00*
Charging box cast	*33.00-34.00*
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt	33.00-34.00
Rails, 18 in. and under	52.00-53.00
Rails, random lengths	42.00-43.00

BIRMINGHAM

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
No. 1 busheling	31.00-32.00
Cast iron borings	12.00-13.00
Short shovel turnings	*22.00-23.00*
Machine shop turnings	20.00-21.00
Bar crops and plates	*39.00-40.00*
Structurals & plate	*39.00-40.00*
Electric furnace bundles	35.00-36.00
Electric furnace:	
3 ft and under	33.00-34.00
2 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	47.00-48.00
Unstripped motor blocks	38.00-39.00
Charging box cast	22.00-23.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 18 in. and under	48.00-49.00
Rails, rerolling	47.00-48.00
Rails, random lengths	41.00-42.00
Angles, splice bars	40.00-41.00

SEATTLE

No. 1 heavy melting	*30.00*
No. 2 heavy melting	*28.00*
No. 1 bundles	*29.00*
No. 2 bundles	*21.00*
Machine shop turnings	*22.00*
Mixed borings, turnings	*22.00*
Electric furnace No. 1	*38.00*

Cast Iron Grades

No. 1 cupola	*31.00*
Heavy breakable cast	*28.00*
Unstripped motor blocks	*23.00*
Stove plate (f.o.b. plant)	*21.00*

LOS ANGELES

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	33.00
No. 2 bundles	24.00
Machine shop turnings	15.00
Shoveling turnings	19.00
Cast iron borings	19.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	42.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00

SAN FRANCISCO

No. 1 heavy melting	*34.00*
No. 2 heavy melting	*32.00*
No. 1 bundles	*30.00*
No. 2 bundles	*24.00*
Machine shop turnings	*16.00*
Mixed borings, turnings	*16.00*
Cast iron borings	*16.00*
Heavy turnings	*16.00*
Short shovel turnings	*16.00*
Cut structurals, 3 ft.	*40.00*

Cast Iron Grades

No. 1 cupola	*43.00*
Charging box cast	*36.00*
Stove plate	36.00
Heavy breakable cast	*30.00*
Unstripped motor blocks	*33.00*
Clean auto cast	*42.00*
Drop broken machinery	*42.00*
No. 1 wheels	36.00

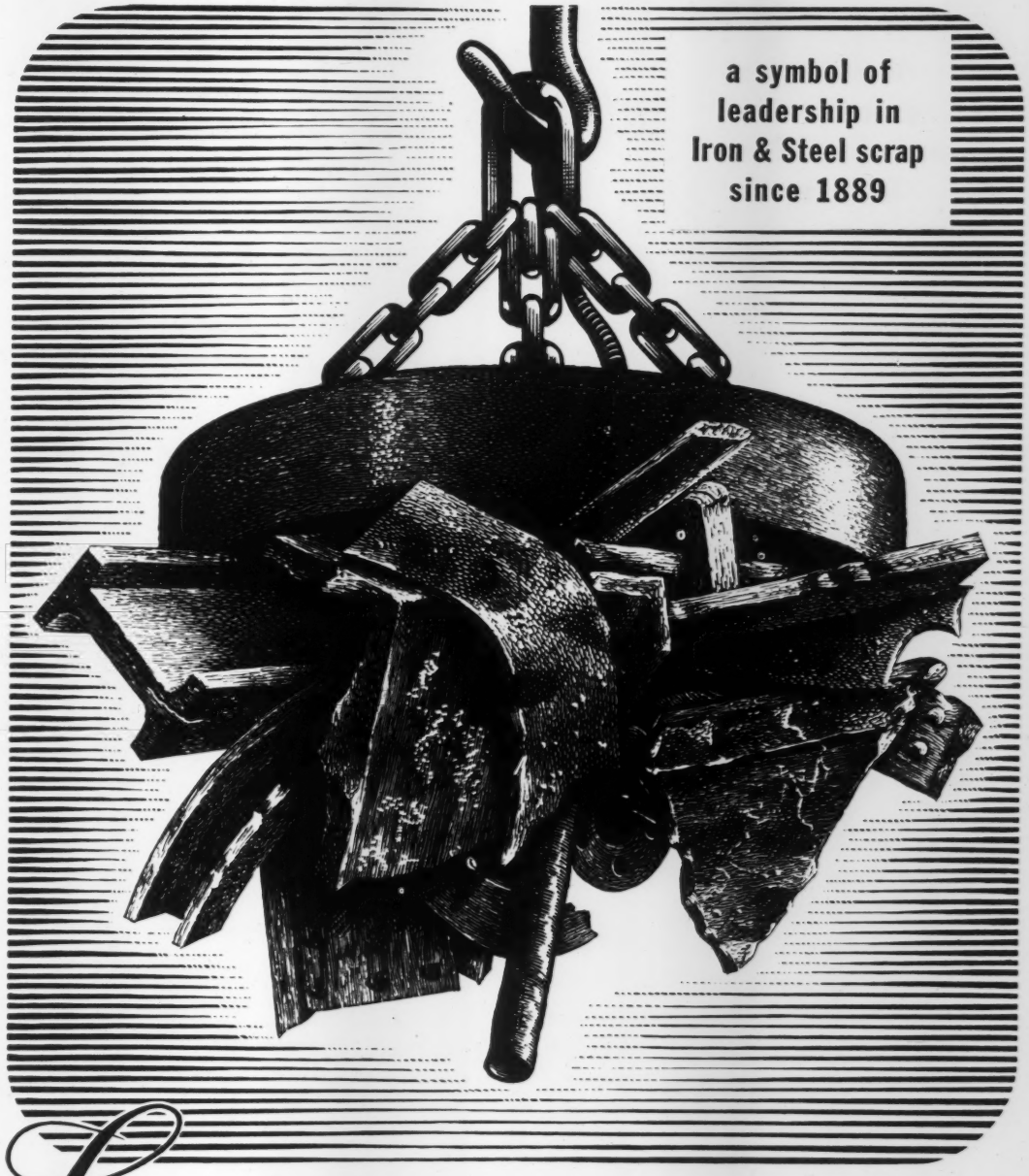
HAMILTON, ONT.

No. 1 heavy melting	*32.00*
No. 2 heavy melting	*27.00*
No. 1 bundles	*32.00*
No. 2 bundles	*22.00*
Mixed steel scrap	*27.00*
Mixed borings, turnings	*17.00*
Busheling, new factory:	
Prepared	*32.00*
Unprepared	*26.00*
Short steel turnings	*21.00*

Cast Iron Gradest

No. 1 machinery cast	*45.00-50.00*

†F.o.b. Hamilton, Ont.



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EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

Aluminum Output Down

Too much capacity for current demand has brought about a slowdown both in primary production and construction of new facilities. Custom smelters lower copper to 25.00c

Nonferrous Metal Prices, Pages 126 & 127

MORE CAPACITY than demand is causing growing pains in the aluminum industry. Though there has been no formal move to curtail production, output has been decreasing since mid-1957.

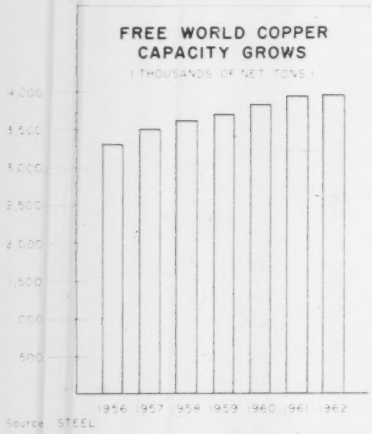
Proof—Domestic primary production hit 1,678,954 tons in 1956. The 1957 total should come to about 1,650,000 tons. The slight decrease was accompanied by a gain in annual capacity of about 65,000 tons. It's estimated that the industry operated at around 130,000 tons under capacity in 1957.

One reason: Power troubles in the Pacific Northwest caused Kaiser Aluminum & Chemical Corp. to shut down two of eight potlines at its Mead, Wash., reduction plant. (Each potline has an annual capacity of around 22,000 tons.) Aluminum Co. of America's west coast operations have been curtailed 25 per cent (one potline at Wenatchee, Wash., and one at Vancouver, Wash.) because of the same situation. It's significant that neither company has tried to get supplementary power. Certainly no aluminum producer is too annoyed by any development that forces it to operate at less than 100 per cent of capacity.

Even more significant is the slowup in construction of new facilities. No construction is being canceled, but it is being stretched out by such things as the elimination of overtime.

Examples — Kaiser has slowed down the construction pace at its Ravenswood, W. Va., facilities. Opening of the Gramercy, La., alumina plant (now 95 per cent completed) will be delayed. Alcoa has stretched out completion of its Warrick, Ind., reduction plant (it's rated at 150,000 tons a year).

Canada—Aluminium Ltd. has indefinitely postponed an expansion program that would raise capacity of its Kitimat, B. C., smelter by 80,000 tons yearly. The facility now has an annual capacity of 180,000 tons but is producing considerably less because of power troubles.



Producers hope that slight stretchouts in expansion will help ease the industry over some of its rough spots. But U. S. capacity will continue to grow this year. One example: Ormet Corp. will begin production at its Burnside, La., alumina plant in April (capacity, 350,000 tons yearly). The company's reduction and rolling facilities in Omal, Ohio, will begin operations sometime in the spring.

Copper: Price Weak

Slack demand and softness on the London Metal Exchange (22.4 cents a pound on Jan. 7) make copper prices vulnerable. Many observers believe it's only a question of time until primary producers cut their price now that custom smelters have backed off to 25 cents a pound. The LME price is 4.6 cents below the primary price.

The price weakness has brought the usual flood of demands from mining state politicians for higher tariffs. But the consensus in nonferrous circles is that Congress will be satisfied with the 1.7 cents a pound import-excise tax that goes into effect on June 30.

Rumors persist that Chile may cut back production by as much as 10 per cent. Certainly such a move is necessary if the world price is to firm, especially in view of the world's growing capacity (see chart).

Nickel to Spain?

It's rumored a large nickel producer is negotiating a contract with the Spanish government for delivery of a substantial tonnage of the white metal.

Elsewhere in Europe demand is reported off. Sales in the U. S. remain mediocre. Observers say no premium price nickel is moving and that producers are finding it increasingly difficult to sell their market price metal.

NONFERROUS PRICE RECORD

	Price Jan. 8	Last Change	Previous Price	Dec. Avg	Nov. Avg	Jan., 1957 Avg
Aluminum ..	26.00	Aug. 1, 1957	25.00	26.000	26.000	25.000
Copper	25.00-27.00	Jan. 8, 1958	25.50-27.00	26.130	26.217	35.433
Lead	12.80	Dec. 2, 1957	13.30	12.800	13.300	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	94.00	Jan. 8, 1958	93.375	92.395	89.288	101.480
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

BRIDGEPORT BRASS
COPPER ALLOY BULLETIN

Bridgeport Reporting New Developments in Copper-Brass Alloys and Metalworking Methods

Duronze #707 Has Many Applications

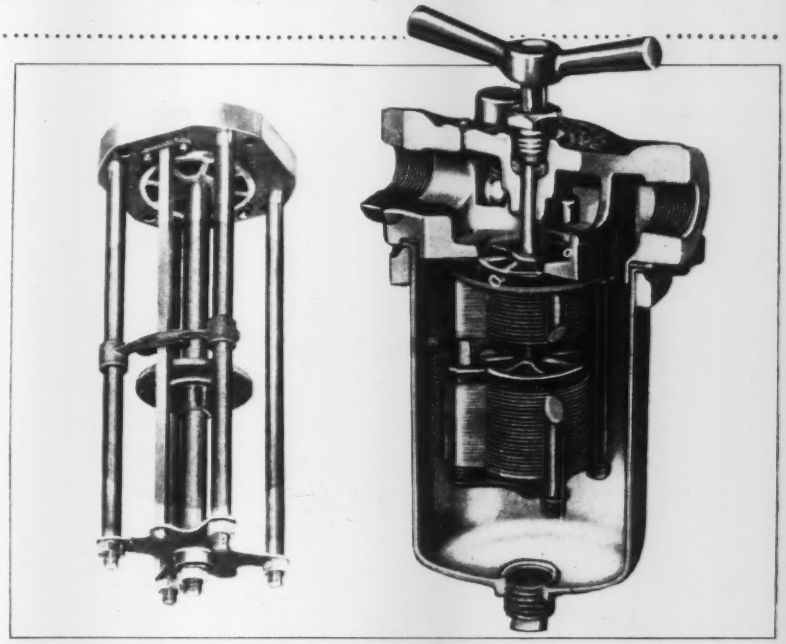
by M. A. BUELL
Chief Staff Metallurgist

Duronze #707 is a truly versatile aluminum-silicon bronze alloy. Its combination of properties—good machinability, corrosion and wear resistance, high tensile strength, low coefficient of friction, and excellent fatigue resistance—is ideally suited to many product requirements.

It can be used advantageously, for instance, as components for solderless wire cable connectors and pole line hardware; for nuts, bolts and studs; and for compression fittings on oil and gas lines in aircraft. Since Duronze supporting sleeves in compression fittings distribute vibration and fatigue stresses over a greater area of the tube than is possible with ordinary fittings, serious breaks in the tube lines can be prevented.

Still another important property offered by Duronze #707 is its high tensile and yield strength in its annealed condition. This makes it especially suitable for hot working into gears, pinions, valve parts, rollers, etc. The friction between Duronze #707 and steel is less than that between steel and steel. It can thus be used to replace steel or cast-bronze parts and generally give longer life. Duronze #707 hot-forgings include suspension clamps and terminals for hollow cable jumper and strain connectors; valves; parts for oxyacetylene torches; and marine hardware.

Duronze #707 is just one of five different aluminum and silicon bronze alloys made by Bridgeport. Each has outstanding combinations of mechanical and physical properties designed to meet specific engineering needs. For more information and test samples call your nearest Bridgeport Sales Office.



Unique Continuous-Flow Filter Uses Duronze Backbone For Strength and Corrosion Resistance

The unusual design of the Auto-Klean® Filter manufactured by Cuno Engineering Corporation, Meriden, Conn., permits it to be cleaned continuously, either manually or by motor, without costly interruption of flows or service.

Filtration is obtained by passing the fluid between wheel-shaped metal discs placed edgewise to the flow. These discs are separated by spacers of predetermined thickness so that solids larger than the spacers cannot pass through. Extending into the slots between the discs are the knifelike cleaner blades. Filtration down to 1 micron is possible.

Duronze #707 Backbone

The mounting of the filter disc and cleaner-blade assembly is vital to efficient operation. To help insure accurate alignment, Cuno relies extensively on Bridgeport Duronze #707 (Aluminum-Silicon Bronze Alloy) to form the main spindles which are the backbone of the assembly. Strong, corrosion resistant and easily machined, Duronze #707 has all the qualities needed for the rigid requirements of this application.

Duronze #707 for Engineering Jobs

Duronze #707 is one of a number of engineering alloys made by Bridgeport to meet the needs of durable, hard-working products. Its high strength and corrosion resistance, plus good machinability are important advantages from both production and economy standpoints. It will pay you to see how Duronze can meet your requirements. Your Bridgeport Salesman, backed by Bridgeport Technical Service, will be glad to help you. Call him today.

*Reg. trade name of Cuno Engineering Corp.

Bridgeport **BRIDGEPORT BRASS**

Bridgeport Brass Company, Bridgeport 2, Connecticut • Offices in Principal Cities
In Canada: Noranda Copper and Brass Limited, Montreal

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, fo.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.55 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 27.00 deld.; custom smelters, 25.00; lake, 27.00 deld.; fire refined, 26.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $80-110 nom. per troy oz.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis, New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $223-230 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz nom.

Palladium: $21-22.50 per troy oz.

Platinum: $76-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.50 per lb, commercial grade.

Silver: Open market, 89.875 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 94.00.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.85.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Diecasting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.50-25.50; No. 12 foundry alloy (No. 2 grade), 21.50-23.25; 5% silicon alloy, 0.60 Cu max., 25.25-26.25; 13 alloy, 0.60 Cu max., 25.25-26.25; 195 alloy, 24.50-27.00; 108 alloy, 22.00-23.25.

Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.50; grade 2, 21.75; grade 3, 20.50; grade 4, 18.50.

Brass Ingot: Red brass, No. 115, 27.25; tin bronze, No. 225, 36.00; No. 245, 30.75; high-leaded tin bronze, No. 305, 31.25; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 24.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.82, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 32.355; l.c.l., 32.98. Weatherproof, 30,000-lb lots, 33.66; l.c.l., 34.78. Magnet wire deld., 40.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates 19.00

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strips, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	.....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.017	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	44.40	51.20
6061-T6	46.90	53.00
2024-T4	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	—Round— 2011-T3	2017-T4	—Hexagonal— 2011-T3	2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45 90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 6.50-

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.13b	47.36c	....	50.32	23.000	23.000	22.250
Yellow Brass	44.02	32.30d	44.56	46.93	17.375	17.125	15.750
Low Brass, 80%	46.50	46.44	47.04	49.31	19.500	19.250	18.750
Red Brass, 85%	47.37	47.31	47.91	50.18	20.250	20.000	19.500
Com. Bronze, 90%	48.78	48.72	49.32	51.34	21.000	20.750	20.000
Manganese Bronze	52.01	46.01	56.61	....	16.125	15.875	15.375
Muntz Metal	46.39	42.20	....	....	16.375	16.125	15.625
Naval Brass	48.27	42.58	55.33	51.68	16.125	15.875	15.375
Silicon Bronze	54.76	53.95	54.80	56.74e	22.625	22.375	21.625
Nickel Silver, 10%	60.43	62.75	62.75	....	23.625	23.375	11.813
Phos. Bronze, A-5%	69.07	69.57	69.57	70.75	23.750	23.500	22.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold--drawn. d. Free cutting. e. 3% silicon. f. prices in cents per lb for less than 20.000 lb, f.o.b. shipping point. On lots over 20.000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 18.50-19.00; No. 2 heavy copper and wire, 16.50-17.00; light copper, 14.50-15.00; No. 1 composition red brass, 15.50-16.00; No. 1 composition turnings, 15.00-15.50; new brass clippings, 13.00-13.50; light brass, 9.50-10.00; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.00-12.50; auto radiators, unsweated, 12.00-12.50; cocks and faucets, 12.50-13.00; brass pipe, 12.50-13.00.

Lead: Heavy, 8.25-8.75; battery plates, 3.50-3.75; linotype and stereotype, 10.25-10.75; electrotype, 9.25-9.75; mixed babbitt, 10.50-11.00.

Monel: Clippings, 28.00-29.00; old sheets, 25.00-26.00; turnings, 20.00-23.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 42.00-45.00; rolled anodes, 42.00-45.00; turnings, 37.00-40.00; rod ends, 42.00-45.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.00; 3003 clippings, 16.50-17.00; 6151 clippings, 16.00-17.00; 5052 clippings, 16.00-16.50; 2014 clippings, 15.50-16.50; 2017 clippings, 15.50-16.50; 2024 clippings, 15.50-16.50; mixed clippings, 15.00-15.50; old sheets, 13.00-13.50; old cast, 13.00-13.50; clean old cable (free of steel), 16.00; borings and turnings, 13.50-14.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.00; light scrap, 48.00; turnings and borings, 33.00.

Copper and Brass: No. 1 heavy copper and wire, 20.75; No. 2 heavy copper and wire, 18.75; light copper, 16.50; refinery brass (60% copper) per dry copper content, 18.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 20.75; No. 2 heavy copper and wire, 18.75; light copper, 16.50; No. 1 composition borings, 18.50; No. 1 composition solids, 19.00; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 15.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 43.79; oval, 42.00, 5000-10,000 lb; electrodeposited, 35.75, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 10-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 111.50; 200-499 lb, 110.00; 500-999 lb, 109.50; 1000 lb or more, 109.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.
Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 71.60; 300-900 lb, 69.60.

Copper Sulphate: 100-1900 lb, 14.55; 2000-5900 lb, 12.55; 6000-11,900 lb, 12.30; 12,000-22,900 lb, 12.05; 23,000 lb or more, 11.55.

Nickel Chloride: Less than 400 lb, 35.00; 400-9999 lb, 33.00; 10,000 lb, 32.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 74.70; 100-600 lb, 65.80; 700-1900 lb, 63.00; 2000-9900 lb, 61.20; 10,000 lb or more, 59.80.

Stannous Chloride (anhydrous): Less than 25 lb, 164.10; 25 lb, 129.10; 100 lb, 114.10; 400 lb, 111.60; 5200-19,600 lb, 99.40; 20,000 lb or more, 87.20.

Stannous Sulphate: Less than 50 lb, 126.90; 50 lb, 96.90; 100-1900 lb, 94.90; 2000 lb or more, 92.90.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

Pig Iron . . .

Pig Iron Prices, Page 114

Foundries are operating on minimum inventories of pig iron. The trend is noted in periodic requests from casters for prompt shipments. Gray iron foundries generally are operating three to four days a week and are buying raw materials only as needed.

Any pickup in demand for castings should be followed quickly by increased buying of pig iron. But foundries lack order backlogs and have been unable to generate enough new business to insure steady runs.

Republic Steel Corp. is offering bessemer pig iron from its Chicago furnaces. This grade is quoted at $67 a ton, the going price in the district.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 116

The Luzerne Coke Co., Indiana, Pa., operator of beehive coke ovens, has been purchased by the

METALLURGICAL SALES ENGINEER

For Eastern District Office recently opened in Baltimore, Maryland.

Graduate Metallurgist with experience in the use and application of ferro alloys in the steel industry. Previous sales experience desirable. Correspondence will be treated confidentially.

Pittsburgh Metallurgical Co., Inc.
3801 Highland Avenue
Niagara Falls, New York
P. O. Box 368 Attn: Sales Department

SALES METALLURGIST

We are looking for a metallurgist with some practical experience in bar and structural sections, who would be interested in working with customers on designing and developing special sections to fit customer's particular requirements. Some sales experience essential. Excellent opportunity for man not over 40 years of age who is free to travel and to whom such opportunity would be a challenge. Please answer to Box 628, STEEL, Penton Bldg., Cleveland 13, Ohio, giving all pertinent information and enclose snapshot if possible.

EXECUTIVE WANTED

A man qualified to take charge of sales and full direction of the operation of a long well-established, fully integrated steel warehouse equipped for all services, located in Cleveland, Ohio.

An unusual opportunity for the right man. Our employes have knowledge of this ad.

Send complete information as to past experience and background to:

Box 630, STEEL
Penton Bldg. Cleveland 13, Ohio

MACHINERY FOR SALE
AT SACRIFICE PRICES
FOR IMMEDIATE DELIVERY

Real estate sold—Must clear buildings
Everything goes—Sacrifice prices
No reasonable offer refused!

BROS 250 HP Type S Water Tube Boiler with Todd Rotary Burner—new approx. 1952.
CLEVELAND #8, 5 ton cap. Traveling Type Steam Operated Self-propelled Locomotive Crane, with 48" magnet and bucket.
SHEPARD-NILES 5 ton Floor Operated Power Driven Electric Hoist—new approx. 1955.
JACKSON #6 Die Sinker.
DENTON 48" x 38" x 84" Oil Fired Furnace—new approx. 1956.
3—CHAMBERSBURG 2000# Model F Board Drop Hammers—Motor Drive.
MASSILLON 1500# — 2000# — 2500# Steam Drop Hammers.
NILES 800# Steam Forging Hammer.
LEBLOND 19" x 44" centers Engine Lathe.
WALCOTT 24" x 60" centers Engine Lathe.
KEARNEY & TRECKER #2B Plain Horizontal Milling Machine.
AMERICAN 48" x 48" x 10' double housing Planer.
NILES 36" x 36" x 14' double housing Planer.
6—BLISS #56, #65 and #73½ Straight Side Trimming Presses.
2—MASSILLON #5 Straight Side Trimming Presses.

ACME 3" MODEL XN UPSET FORGING MACHINE — NEW APPROX. 1955.

AJAX 3" Upset Forging Machine—New approx. 1940.
2—AJAX 4" Upset Forging Machines.
NATIONAL 4" Upset Forging Machine.
Also: Blowers, Hoists, Presses, Spare Parts, Motors, Pumps, Lockers, Conveyors, GASOLINE TRACTORS, FORK LIFT TRUCKS, DUMP TRUCKS, RAILROAD TRACK, SLY Dust Collector, WESTINGHOUSE 17½ KW Generator Set and other items.

Come—Inspect—Buy at prices you can't afford to miss!

GLOBE SYRACUSE ASSOCIATES
341 PEAT STREET SYRACUSE, N. Y.
Phone: Granite 9-6661—N. Y.: Al 4-6560

CLASSIFIED

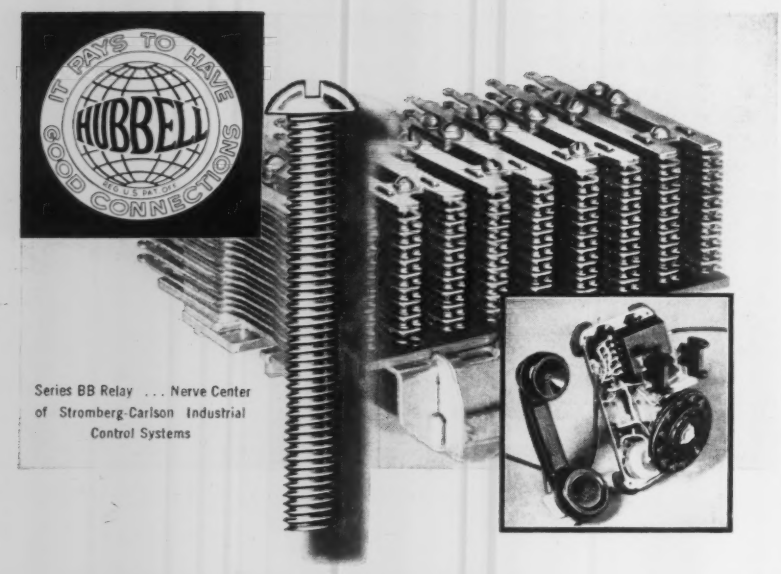
Positions Wanted

SALES EXECUTIVE: For Alloy Plate Fabrication, graduate engineer with a twenty year background in production, engineering and sales management of custom built chemical process equipment primarily in the alloys. Seek new challenge in N. Y., N. J. or Pa. area. Write Box 626, STEEL, Penton Bldg., Cleveland 13, Ohio.

WANTED

One—36"—48" x 216" to 240"
ROLL GRINDER—USED
Preferred with crowning attachment.

CALL OR WIRE:
L. Jeffers
Aetna-Standard Engineering Co.
Ellwood City, Penna.
Phone: Plaza 8-4511



Series BB Relay . . . Nerve Center of Stromberg-Carlson Industrial Control Systems

SECURED with HUBBELL

HIGH TENSILE STRENGTH STAINLESS STEEL MACHINE SCREWS

Nerve center of many Stromberg-Carlson industrial controls is the multi-contact relay above, each contact spring and insulator of which is carefully sandwiched together and compressed under high pressure, ready for insertion of the binding screws. In order for the relay to operate satisfactorily the binding screws must maintain these high pressures so that the contact springs cannot and will not twist, loosen and shift position.

Ordinary machine screws just couldn't "stand the gaff". They stretched and broke under the strain, thereby causing endless production and maintenance headaches. Only after Stromberg engineers had set a rigid performance standard could the solution be found. Hubbell high tensile stainless steel machine screws made to Stromberg-Carlson specifications, proved to be the answer.

Lowest Cost To Service

Quite obviously, better materials and components add to the initial cost of any product. But how about the long term cost? When a product assembles quickly and easily, performs satisfactorily and requires a minimum of maintenance, the initial "extra" cost is quickly offset. Are you putting this time-tested principle into practice? Start today by specifying Hubbell quality fasteners.

Prices and delivery on request. Simply send blueprint or sample of the item.

HARVEY HUBBELL, INC.

HIGHEST QUALITY
WIRING DEVICES • MACHINE SCREWS

OVER 60 YEARS' EXPERIENCE in the manufacture of highest quality, rolled thread machine screws and special cold headed parts.

MACHINE SCREW DEPARTMENT BRIDGEPORT 2, CONNECTICUT

Shenango Furnace Co., Sharpsville, Pa.

Iron Ore . . .

Iron Ore Prices, Page 116

Receipts of iron ore in November totaled 9,535,825 gross tons, against 14,291,219 in the like month of 1956. November tonnage brought receipts for the first 11 months of 1957 to 135,289,372 gross tons, compared with 121,775,475 in the corresponding period of the preceding year.

Stocks of ore held on the last day of November were 72,042,487 tons, against 63,744,139 on the like date in 1956.

November consumption was 9,480,141 tons, against 11,627,649 in November, 1956. Total consumption in the first 11 months of 1957 was 122,279,960 tons, compared with 113,454,560 in the like period of 1956.

Structural Shapes . . .

Structural Shape Prices, Page 108

Deliveries of structurals continue to improve. Heavy shapes that were in short supply until late 1957, now can be obtained without difficulty.

At Pittsburgh, price weakness is developing in fabricated structurals, with buyers demanding lowest prices and prompt service. Seasonal conditions have curtailed commercial construction in the area. Industrial construction also is declining.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1000 tons, transmission towers for Bonneville Power Administration, Portland, Oreg., to Anchor Metals Inc., Hurst, Tex., at $288,449.

630 tons, five state bridges, thruway, Erie County, Pa., to the Levinson Steel Co., Pittsburgh; S. J. Groves & Sons, Ann Arbor, Mich., general contractor; Jones & McKnight, Pittsburgh, concrete reinforcing bars.

McClosky & Co., Philadelphia, general contractor; 6000 tons, reinforcing bars, to the Bethlehem Steel Co., Bethlehem, Pa.

250 tons, high school, Annapolis, Md., to Bethlehem Fabricators Inc., Bethlehem, Pa.; Cogswell Construction Co., Baltimore, general contractor.

200 tons or more, 698-ft Kootenai River bridge, Montana, to unstated eastern fabricator; general contract to N. A. Nelson Construction Co., Sheridan, Wyo., low at $687,696.

116 tons, highway bridges, Alaska, to the Bethlehem Pacific Coast Steel Corp., Seattle; general contract to Cole & Paddock, Juneau, Alaska, low at $399,376 (56 steel piles, 1840 lineal ft of steel piling, and 35 tons of reinforcing bars also involved).

115 tons, boiler supports, Philadelphia Electric Co., Philadelphia, to the Bethlehem Steel Co., Bethlehem, Pa.; Combustion Engineering Co., New York, contractor.

100 tons or more, headquarters building, Bureau of Old Age & Survivors Insurance, Baltimore, to the Potomac Iron Works.

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Cancer can't strike me, I'm hiding.

What I don't know won't hurt me.

Cancer?

Lots of people die of it, I know . . . but the American Cancer Society says a great many deaths from cancer are NEEDLESS *deaths. That's why I do what they tell me. I have an annual medical checkup however well I feel. I know the seven danger signals. And when I want sound information, I get it from my Unit of the*

AMERICAN CANCER SOCIETY

Here's a system that spells safety—nothing to trip over, no congestion—no heavy handling

Trucks containing motor sub-assemblies, move freely and constantly from work tables to the next process.

Special "Y" type device at top of truck mast automatically engages with the trolley rod moving on the Landahl Chainless Conveyor. Manual release at discharge station releases the truck. Let an experienced Landahl engineer help with your conveyor problems. Write for Bulletin LS-2.

LANDAHL CONVEYOR DIVISION

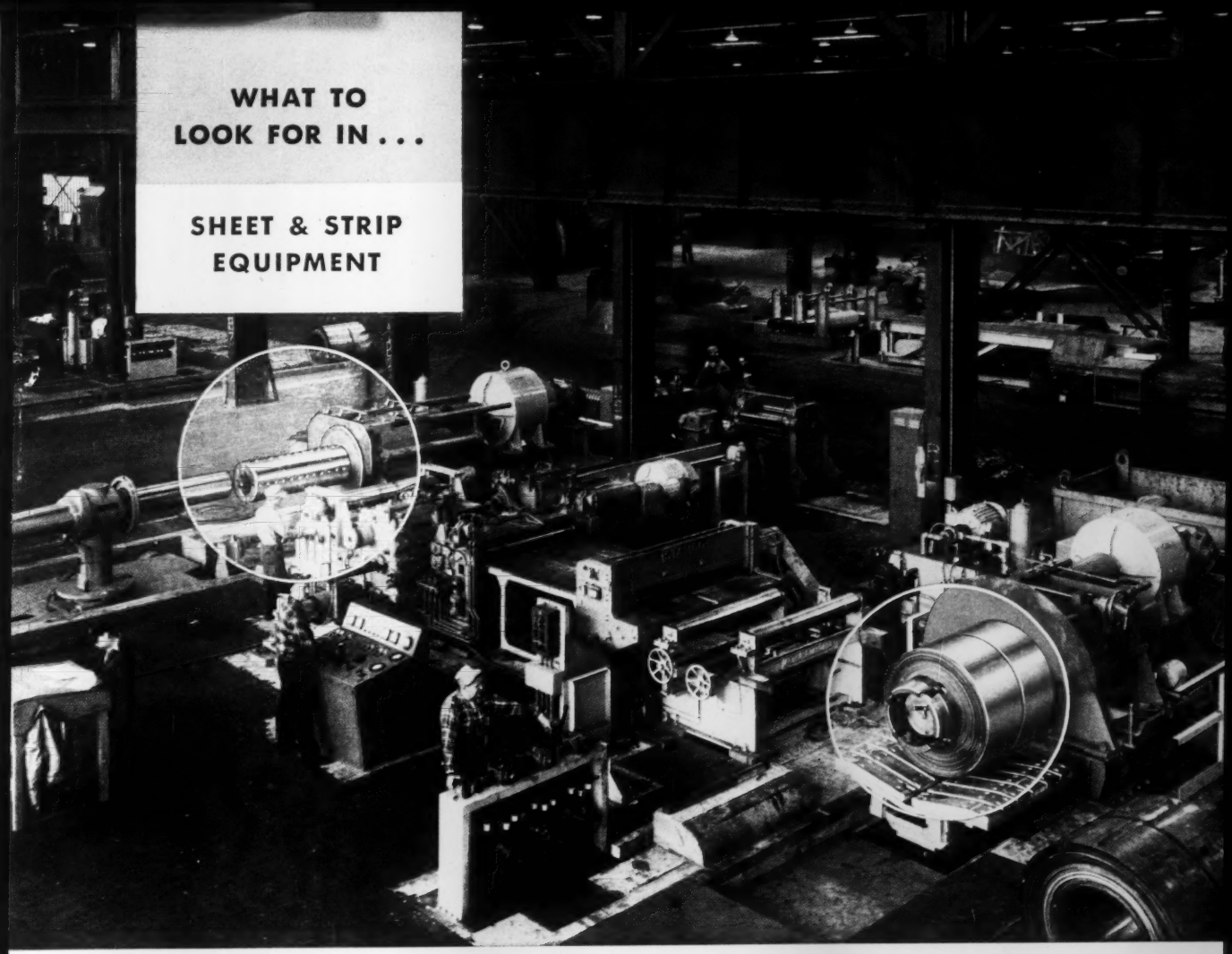
AMERICAN MONORAIL

ENGINEERED MATERIALS HANDLING

OVERHEAD HANDLING EQUIPMENT

13102 ATHENS AVENUE
CLEVELAND 7, OHIO

MEMBER OF MATERIALS HANDLING INSTITUTE AND MONORAIL MANUFACTURERS ASSOCIATION



there's a DIFFERENCE IN REELS

Balanced Drum Segments, interlocked and chrome plated to prevent scoring of drum.

Shafts mounted in anti-friction bearings with ample thrust and radial load capacity.

Hydraulic traversing and elevating coil carriage.

Coil Stripping Device (Tension Reel) prevents telescoping of coil.

OPERATOR EASE: Adequate drum expansion permits loading or unloading coils easily Hydraulically operated strip aligner permits 6" movement either side of center line of line. Automatic Gripper Bar on Tension Reel grips strip from minimum to maximum without adjusting. Suitable for either over or underwinding of strip. On Payoff Reel, patented coil centering by adjustable stop plate supported by two round steel racks . . . easily adjusted with handwheel. Indicator gives operator a clear view of strip width.

EASY MAINTENANCE: Oil Seals of special split design for drive housing; circulating oil system for drive with separate motor drive. Balance of unit easily serviced by accessible fittings or centralized lubrication system.

GOOD DESIGN: 4-segment Drum provides more contact with coil I.D. The Tension Reel starts winding any coil in an almost perfect circle. Aetna's design of reels puts minimum unit pressure on sliding shoes when full weight of coil is on the drum.

RUGGEDNESS: Helical Gear Drive—quiet and smooth, strong, less weight; heavy structural steel weldment with machined ways provides a rugged strong base for high speeds without vibration

AETNA•STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. • PLANTS: ELLWOOD CITY, PA., WARREN, OHIO • RESEARCH LABORATORY: AKRON, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ANNEALING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

How 689 Mills Cut Bearing Cost Per Ton Of Steel Rolled

By mounting roll necks on Timken® tapered roller bearings, a rapidly increasing number of steel mills keep production high, downtime low, and hold bearing cost per ton of steel rolled at rock bottom. Here's why:

1. **LONGER BEARING LIFE.** Tonnage records from hundreds of mills demonstrate that the long life of Timken bearings on mill roll necks holds bearing cost per ton of steel rolled, to a minimum.

2. **BETTER MILL RIGIDITY.** Timken roll neck bearings have a unique balanced proportion design that lets you use larger roll necks than ever before possible with tapered roller bearings.

3. **SIMPLIFIED LUBRICATION.** You don't need complicated lubricating systems when you use Timken roll neck bearings. They permit use of simpler, less expensive grease lubrication.

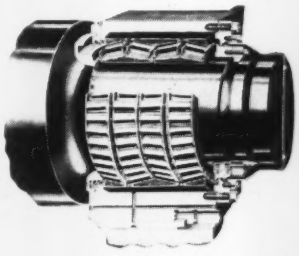
4. **HIGHER LOAD RATINGS.** Balanced proportion design provides up to 40% greater bearing capacity than previous designs for a given mill roll size.

5. **SPECIAL THRUST BEARINGS ELIMINATED.** Because Timken bearings are designed to take *both* radial and thrust loads, they save you the extra cost of special thrust bearings.

6. **STEEL LOSS ENDED IN MILL STOPS AND STARTS.** With mill roll necks mounted on Timken tapered roller bearings, you can start your mills under full load—and end unnecessary loss of steel.

7. **FASTER MILL ROLLING SPEEDS.** Because Timken bearings are designed with true rolling motion and practically eliminate friction, your mills can roll at higher speeds than otherwise possible.

You can get all these advantages in existing or new equipment when you specify Timken tapered roller bearings for your back-up and work rolls. Get complete details from our specialists. Just call or write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD